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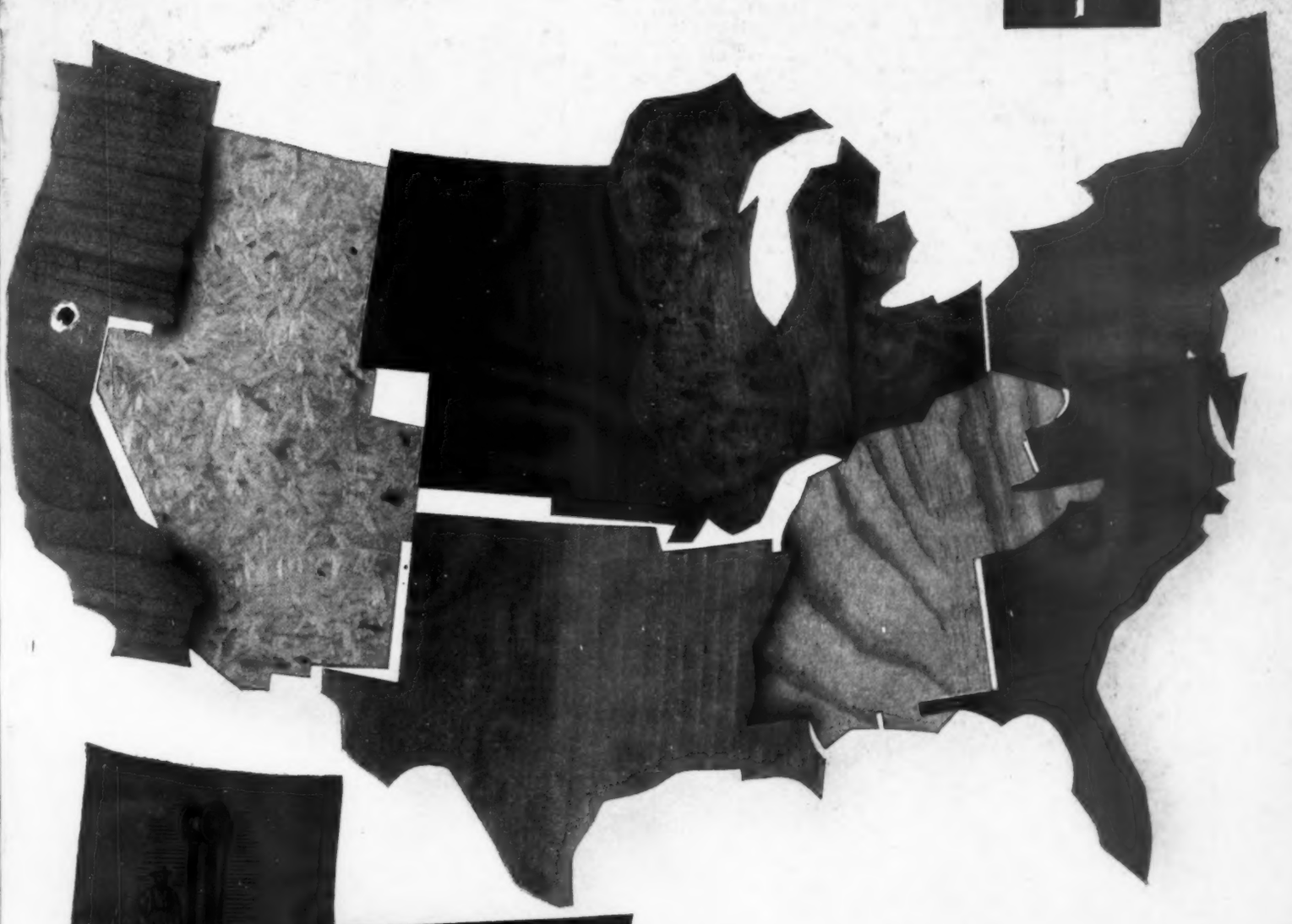

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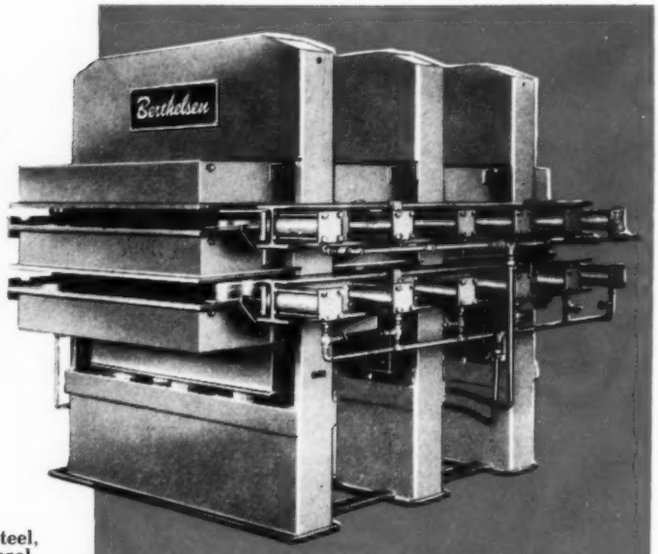
Take a close look at . . .

The

BERTHELSEN PRESS

Chambered Platen*

. . . its unique design INSURES QUALITY CONTROL unmatched by any other method of pressing . . . hot or cold!



Berthelsen Platens are constructed of firebox steel, welded by a special process to insure rigidity and parallelism. As an independent rigid structural member of the press, the platen remains flat and parallel (see Fig. 1) even if work compresses slightly (as wood does in the presence of heat and pressure). This assures uniform pressure distribution and a better, flatter more accurate panel . . . an extremely important advantage in metal bonding and plastic overlay work.

In the cut-a-way illustration of the Berthelsen Chambered Platen, arrows indicate the unrestricted flow of steam or other heating media even at low pressures and temperatures. The generous capacity of this patented design* provides a heat reservoir eliminating fluctuation in platen temperature when in contact with the press load. Heat is evenly transmitted to the work because of the large surface contact between the heating medium and the inner surfaces of the platen. (See Fig. 2) *No other platen design** can offer more uniform temperatures over even very large pressing areas in any temperature range. This exact control of temperature and pressure insures complete quality control of the end product in all types of operations.

*The Berthelsen Chambered Platen is registered at the U.S. Patent Office under Pat. No. 2,627,289 and protected by other patents in countries throughout the world. It is only one of many Berthelsen Hot Press design and construction features that insure control of the variable factors affecting quality and rate of production in pressing operations. Write today for complete brochure and help on your specific pressing problem.

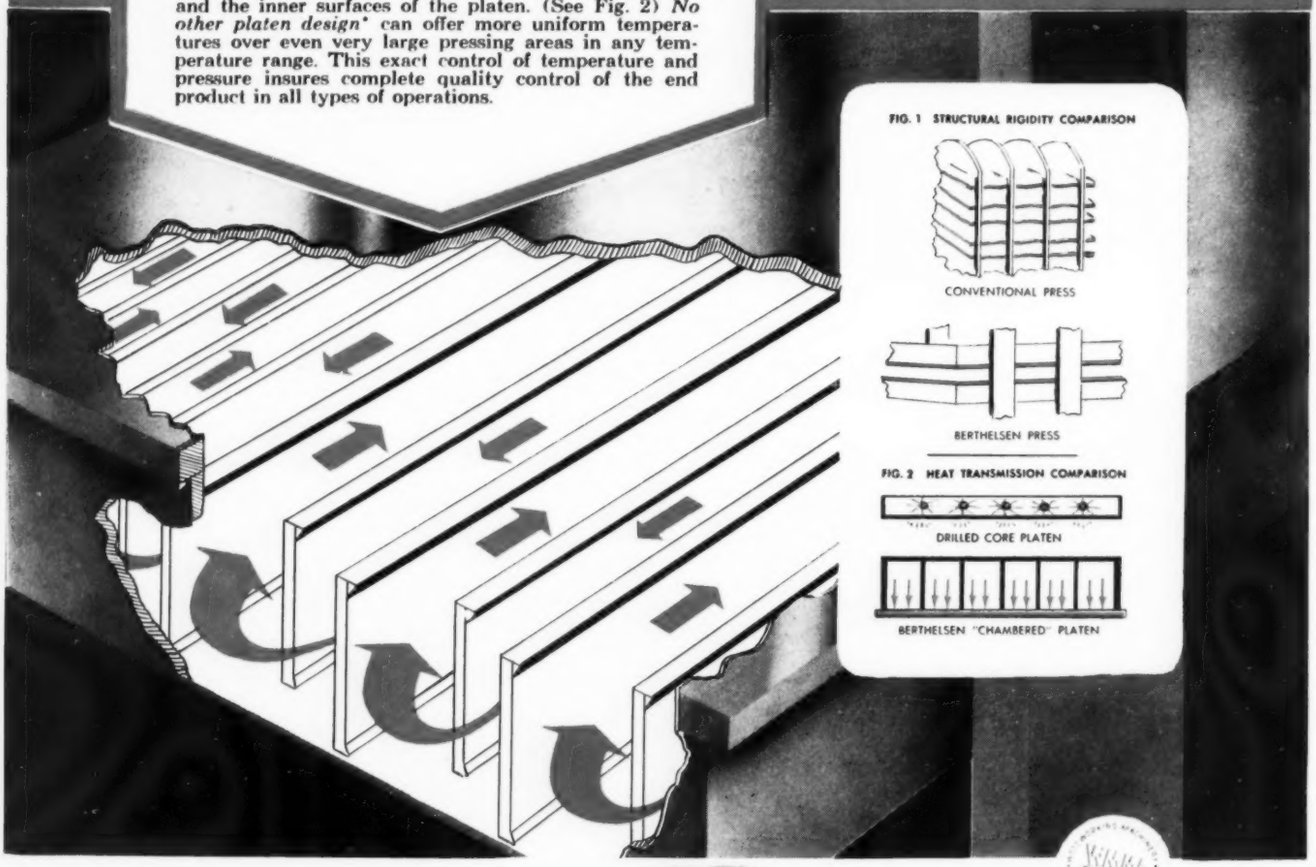


FIG. 1 STRUCTURAL RIGIDITY COMPARISON

CONVENTIONAL PRESS

BERTHELSEN PRESS

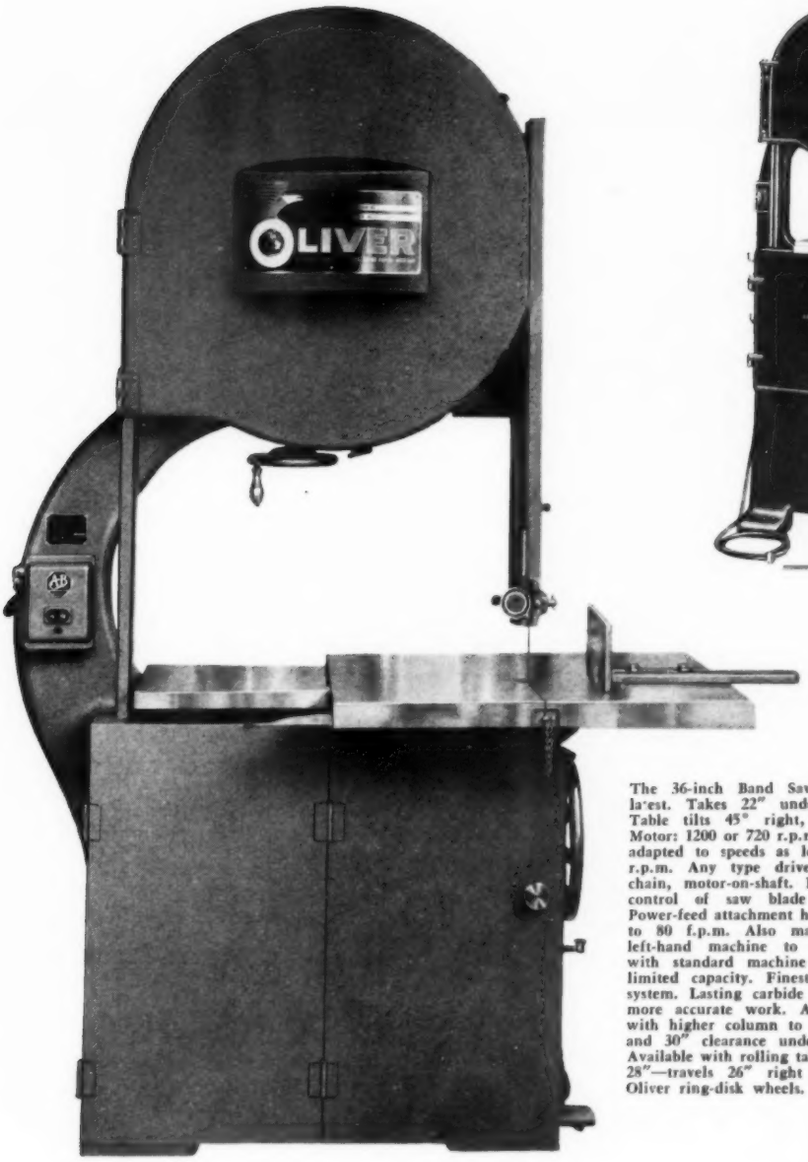
FIG. 2 HEAT TRANSMISSION COMPARISON

DRILLED CORE PLATEN

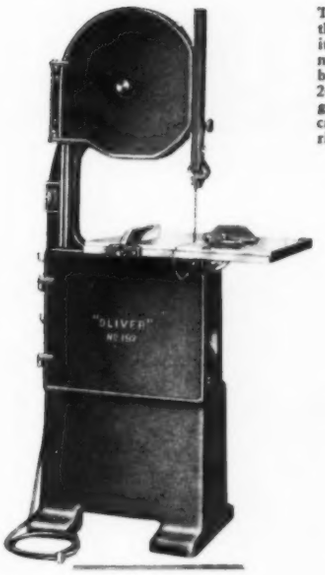
BERTHELSEN "CHAMBERED" PLATEN

BERTHELSEN PRESSES

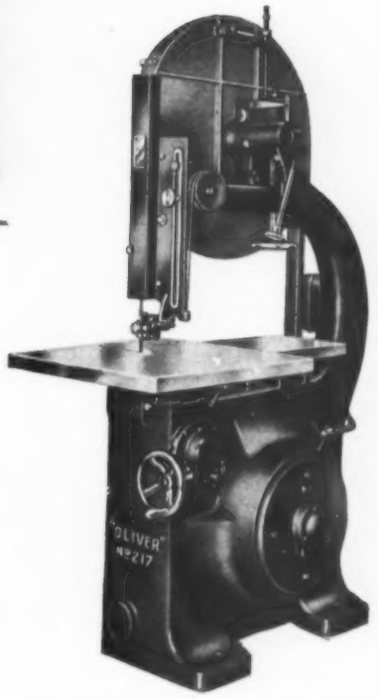
P. O. BOX 1423 • LOCKPORT ROAD • JOLIET, ILLINOIS



The 36-inch Band Saw is our latest. Takes 22" under guide. Table tilts 45° right, 5° left. Motor: 1200 or 720 r.p.m. Can be adapted to speeds as low as 13 r.p.m. Any type drive: belted, chain, motor-on-shaft. Electric control of saw blade tension. Power-feed attachment handles up to 80 f.p.m. Also made as a left-hand machine to be used with standard machine for unlimited capacity. Finest braking system. Lasting carbide jaws for more accurate work. Also built with higher column to give 35" and 30" clearance under guide. Available with rolling table 18" x 28"—travels 26" right of saw. Oliver ring-disk wheels.



The Oliver 18-inch machine is the most complete Band Saw of its capacity. Has many refinements and adjustments of larger band saws. Heavily ribbed table—24" x 20". Takes 10" under guide. Rips 11" wide, miters and crosscuts 6½". Table tilts 45° right. Motor-drive or belt-drive.



Oliver 30-inch Band Saw is sturdy, powerful. Postive brakes for utmost safety. Table tilts 45° right, 10° left. Motor-drive or belt-drive. Takes 15" under guide. Electric saw blade tension control.

Choose new OLIVER Band Saws for smooth and fast scroll work

You'll find Oliver Band Saws speeding work through the machine rooms of leading woodworkers. Oliver Band Saws have been completely redesigned. Bar none, they are the finest engineered machines for cutting woods, metals and plastics! They're built in four sizes and various capacities to handle a wide range of work. All wheels dynamically balanced to run true and steady at all times for vibrationless, high-speed operation. Adjustments are easily made and hold for long runs. Controls are placed for operator's convenience. Tension of saw blade is electrically controlled. Even small blades are used with little danger of breakage. The positive braking system does not strain the blade nor injure the tire. It prevents broken blades from coiling or "throwing" the end. Oliver Band Saws are safest to operate. All these features add up to smooth, clean cuts, increased output, and lower production costs for you.

Oliver also makes a 38-inch Band Saw, heavy duty Jig Saws, and the newest Brazer for band saw blades. Write today for bulletins.

OLIVER
SINCE 1890

OLIVER MACHINERY COMPANY
Grand Rapids 2, Michigan

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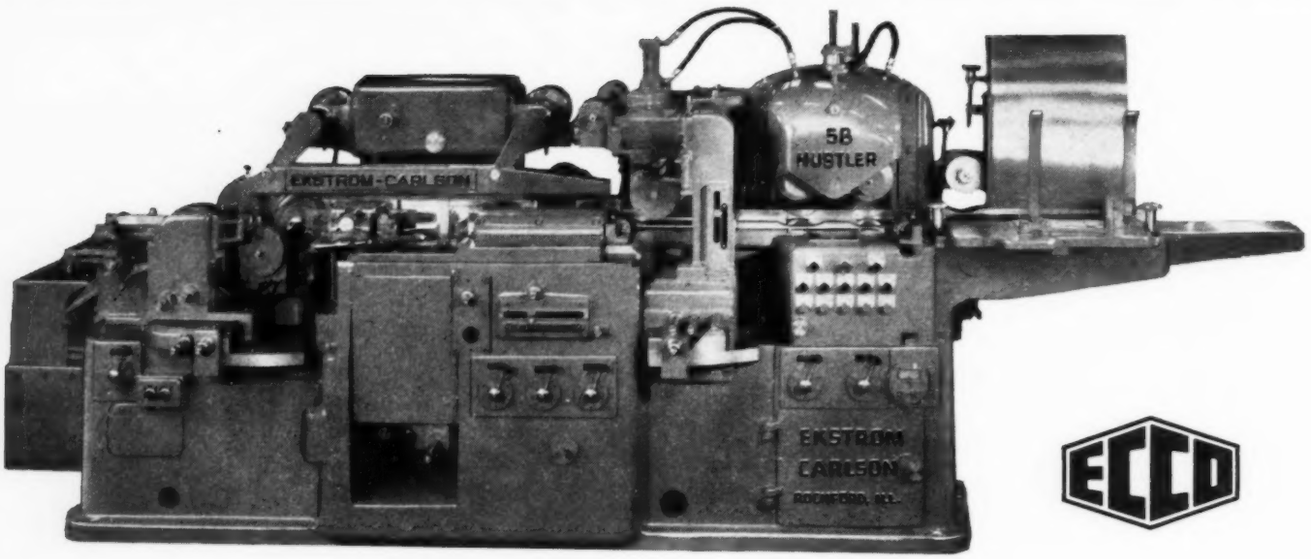

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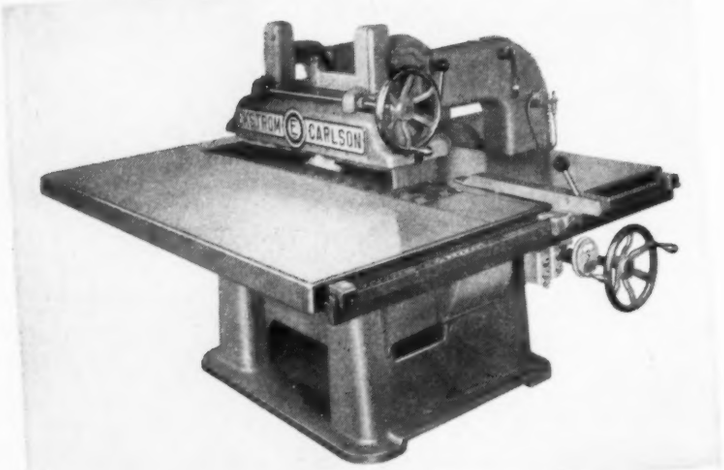

58 HUSTLER HI SPEED MOULDER

Spindle speeds 7200, 10,800 and 14,400 RPM provide an astonishing smooth finish to material. Angulating spindles provide shear cutting with straight knife heads. Has hydraulic pressure and movement controls. An entirely new concept in moulder design. **Send for Bulletin 58.**

MODEL E RIP SAW

Straight line, glue joint rip saw that features variable feed control from 56 to 225 FPM, patented throat inserts, interchangeable chains AND races and smooth vibrationless performance at fast feed speeds. **Send for Bulletin E.**

606 BEE-LINER CUT OFF SAW

A rugged, precision unit with perfect balance, light weight ram and powerful motor provides exceptionally fast and accurate cross cutting. **Send for Bulletin 606.**

THE COMPLETE ECCO LINE

No matter what your requirements are, you are sure to find a high quality Edge Belt Sanders, Pneumatic Drum Sanders, Shapers and Routers woodworking machine in the **complete** ECCO line including moulder cutterheads, router bits, form cutters and carbide-tipped cutters. Get the facts and latest information — write for complete Bulletins and specifications today. Use the coupon below.

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SEND INFORMATION ON THESE MACHINES

Name_____
Position_____
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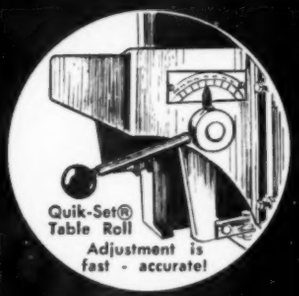
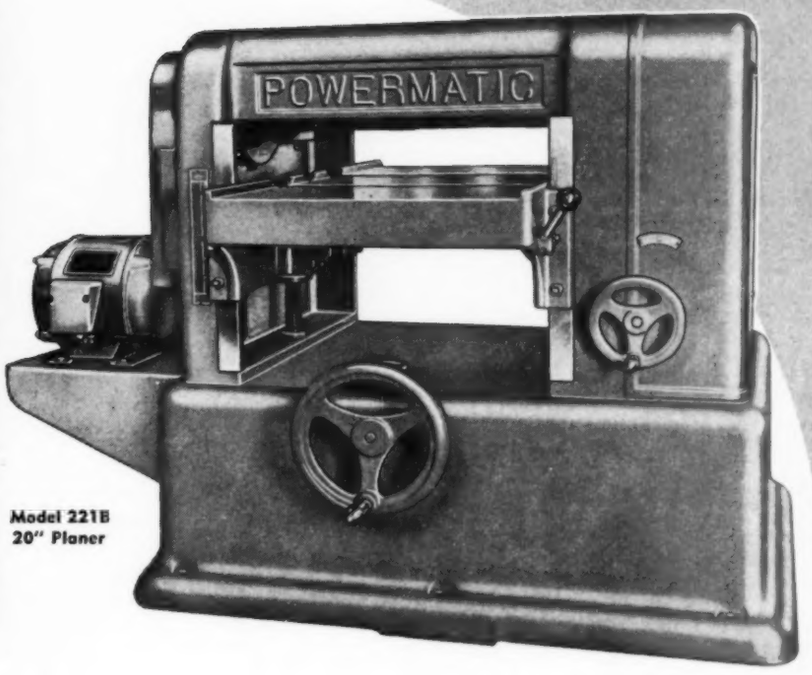
CHANGE FROM ROUGH TO FINISHED STOCK IN SECONDS FOR HIGH PRODUCTION SAVINGS



Quik-Set® Table Roll
Adjustment is fast - accurate!

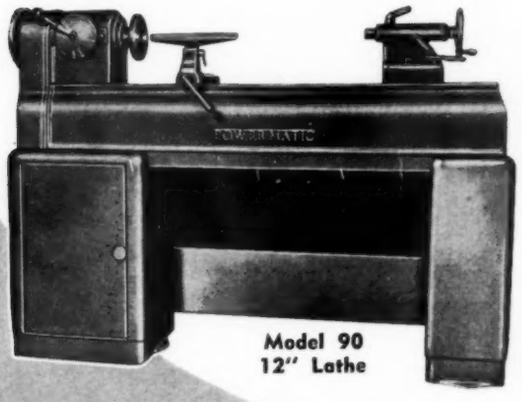
Knife-Grinding & Jointing Attachment (Optional)

3-Knife Cutterhead Std. (4-Knife Optional)



Model 221B
20" Planer

PRECISION WOODTURNING—METAL SPINNING
Engineered for precision duty in any shop . . . large or small. 500 to 4000 RPM variable speed. Sealed ball bearing spindle mounting.



Model 90
12" Lathe

NEW LABOR ECONOMY FOR YOU

Here's the planer that makes the job of surfacing a wide range of stocks *really* fast and simple! Never again does the operator spend hours with adjusting wrenches to make stock change-overs. He now does it with a flick of the wrist using the convenient Quik-Set® Table Roll Adjustment. Adjusts all rolls from 0" to .040" in a second! . . . and it's *standard equipment!*

- ALL PARTS CAST IRON OR STEEL — NO DIE CAST
- BELTED OR DIRECT DRIVE
- CHOICE OF 5, 7½ or 10 HP MOTOR
- FEEDS 20 TO 50 FPM

MAIL COUPON TODAY FOR FULL DETAILS

DEALERS IN PRINCIPAL CITIES

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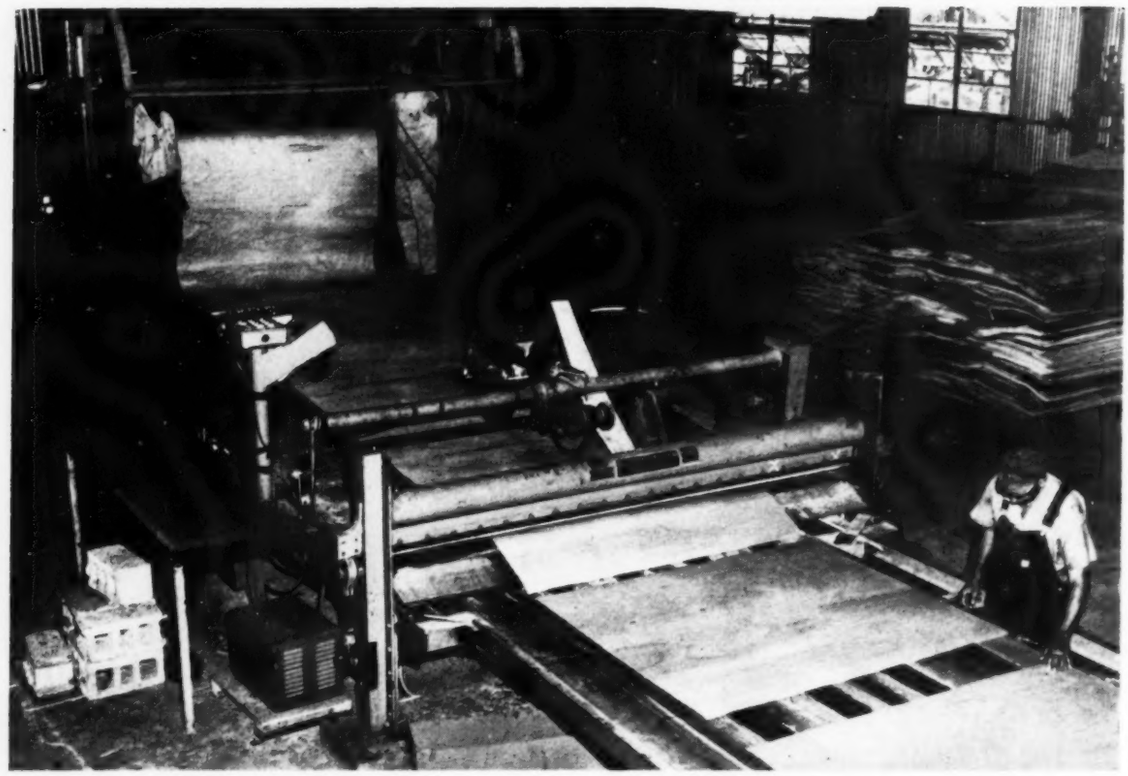
MERRITT - SOLEM VENEER CLIPPERS

A VITAL LINK IN YOUR PLYWOOD PRODUCTION

WHETHER AUTOMATIC OR PUSHBUTTON CONTROLLED



A Merritt-Solem Clipper at work in the mill of Pascagoula Veneer Company, Pascagoula, Mississippi. Merritt-Solem makes the unreeling device and conveyor, too.

THEY CLIP THEIR WAY TO GREATER PROFITS!

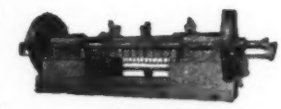
As veneer is peeled from the log by the Merritt-Solem Veneer Lathe, the Merritt-Solem Clipper takes over and keeps your production rolling. Merritt Clippers are adaptable to plain single sheet and heavy book clipping; also clipping from the reel as shown here.

SOLEM'S NEW PLANT IN ROCKFORD

Solem's new modern plant in Rockford, Illinois is conceived and planned with the idea of bringing Solem Machine Company and the Merritt-Solem Division together under one roof as soon as possible, to more closely integrate and expedite the entire operation. This large modern plant will make it possible for us to pass still greater benefits along to our customers and provide them with still better service.

HEAVY-DUTY - DEPENDABLE

Like all Merritt-Solem machines, their Veneer Clippers are heavy-duty outfits. Back-geared for extra power on all but the smallest models, and driven by a magnetic unit consisting of an electrically-controlled clutch and brake. Base is welded steel box construction—heavy enough to withstand constant use for many years; anti-friction bearings are used throughout.

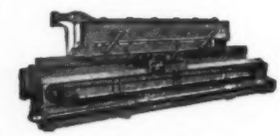


Veneer Lathes

SAFETY CONTROLS

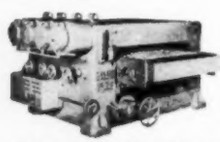
Correct timing of the clipper is maintained through an electrical system; brake is automatically engaged after each stroke of the knife. Two-button controls for one operator, or four-button for two operators are available, if desired.

Many other valuable features are available.



Veneer Jointers

WRITE TODAY FOR MORE INFORMATION



Solem Endless-Bed Sanders

Roll Feed Double-Deck Drum Sanders

Hot Plate Presses

MERRITT-SOLEM DIVISION

SOLEM MACHINE COMPANY

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Plant-in-miniature set up consists of mixer at right, hydraulic press at center, and hot press at left. This equipment is part of the laboratory at the Formica Flakeboard plant. See page 29 for the complete article.

NOVEMBER '58

hitchcock's WOOD WORKING

Vol. 60

No. 11

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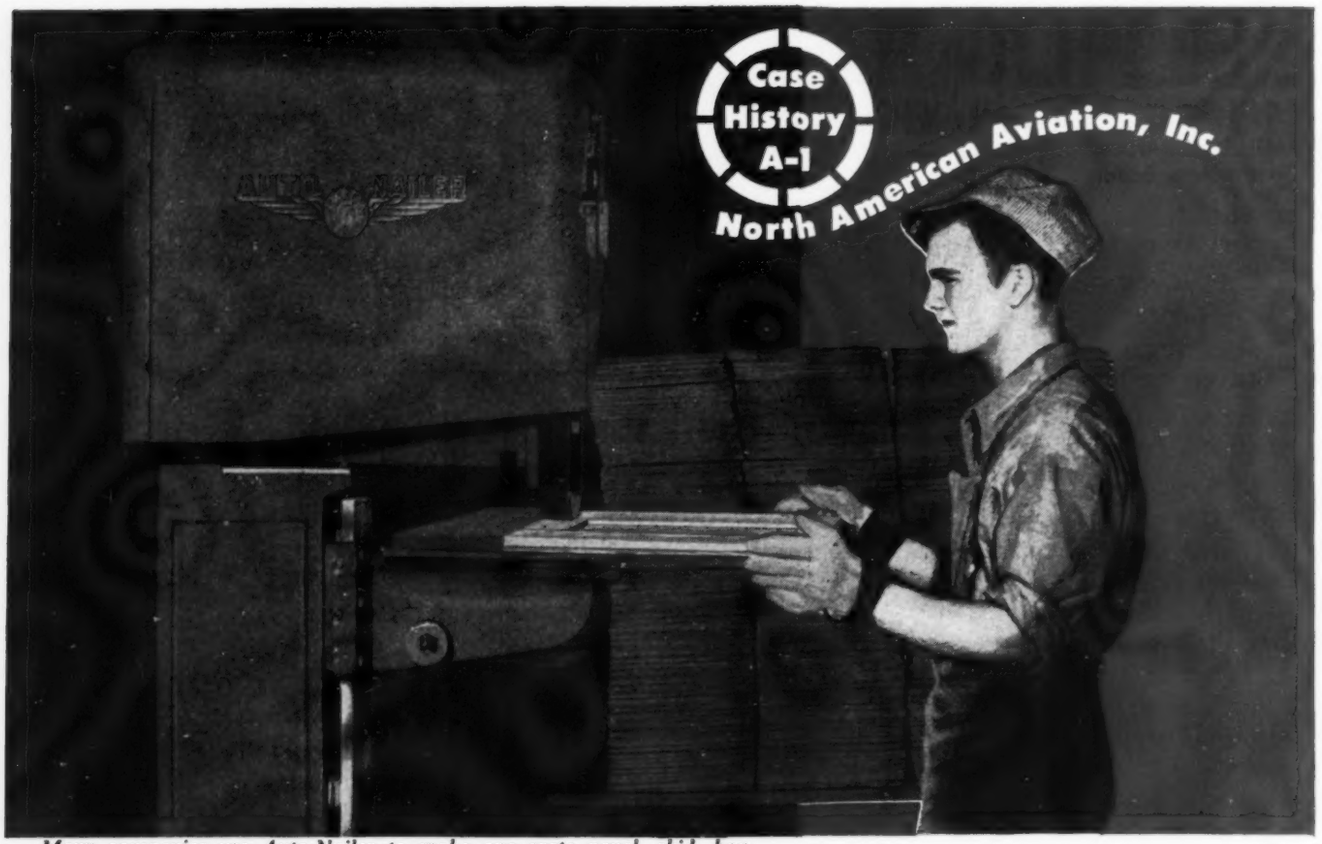


Many companies use Auto-Nailer to make one crate panel, skid, box shook or pallet or thousands alike with mass production economies.

Time study reveals Auto-Nailer saves 41.82% over hand-nailing of shooks

Actual production figures at the big Ohio plant show Auto-Nailer saves 235 man-hours per month making cleated plywood box panels. Many other companies report similar results.

• Auto-Nailer makes its own nails from a coil of wire and drives up to 3-a-second. • Practically no set-up time required. • Instant choice of any nail length from ½" to 2¾". • Drives nail heads flush or countersinks them uniformly. •Drives nails plain, bradded, or clinched.

See samples of your own containers auto nailed

Write for the Auto-Nailer Representative to visit — he'll give you complete information and arrange for samples of your own containers to be auto nailed for your inspection. Or, send for the colorful, free Auto-Nailer catalog with a partial list of Auto-Nailer users.

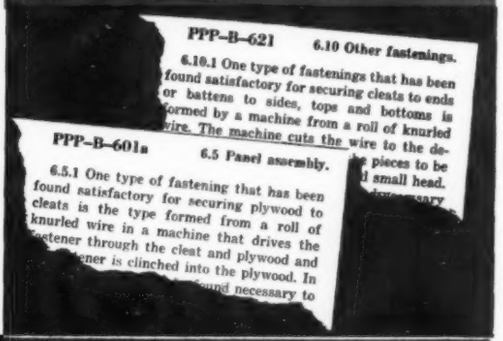
See Auto Nailers demonstrated—Booths 113-114, American Woodworking Machinery and Equipment Show, Winston-Salem, May 13-17

Auto-Nailer Company

A few of the many jobs Auto-Nailer excels in:

• Skids • Box shooks • Wood box ends • Cleated plywood and paper-overlaid veneer panels • Expendable pallets • Hogshead ends • Crate tops, bottoms, ends, sides • Reel ends • Internal blocking assemblies

Hercules-9 Auto-Nailer bonds wood members together under pressure adjustable up to 1500 lbs. Hurricone Drive eliminates splitting.



PPP-B-621 6.10 Other fastenings.

6.10.1 One type of fastenings that has been found satisfactory for securing cleats to ends or battens to sides, tops and bottoms is formed by a machine from a roll of knurled wire. The machine cuts the wire to the de- pieces to be small head.

PPP-B-601a 6.5 Panel assembly.

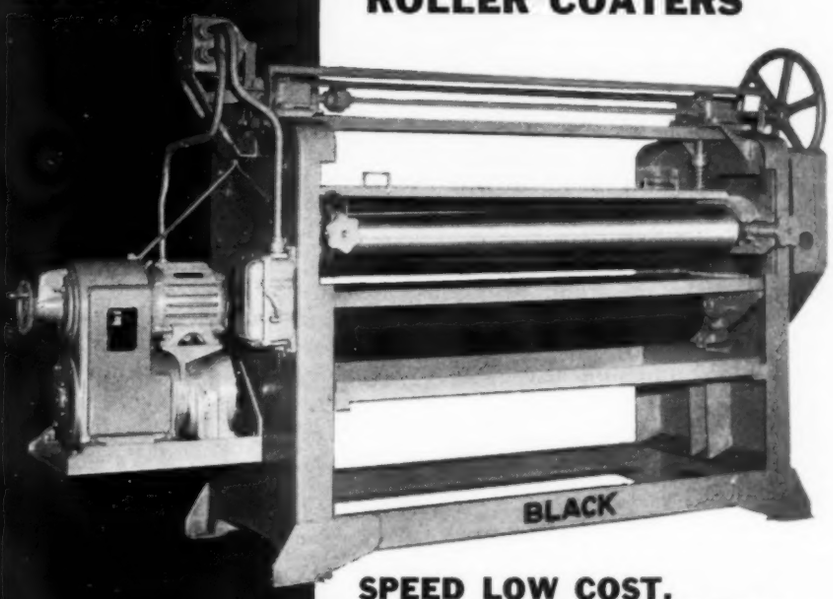
6.5.1 One type of fastening that has been found satisfactory for securing plywood to cleats is the type formed from a roll of knurled wire in a machine that drives the fastener through the cleat and plywood and ener is clinched into the plywood. In found necessary to

Auto-nailed containers meet the requirements of Federal Specifications PPP-B-601a and PPP-B-621, Amendment 3.

AUTO-NAILER 267 Marietta Street, N.W., Atlanta 13, Georgia

BLACK BROTHERS

HEAVY-DUTY ROLLER COATERS



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- 21 Standard Sizes From 8" to 122" Wide Capacities
- 0-4½" Thickness Adjustment
- Single or Double Coaters
- Patented Safety Control
- Drip-Proof Reservoirs
- Precision Ground Rolls
- Ball Bearing Throughout
- Micrometic Adjustments
- Single or Variable Speed Drives

Plus many extra-value optional features

SPEED LOW COST, HIGH QUALITY COATING

Whether your finishing needs are intermittent or geared to 24-hour-a-day automation, Black Brothers Roller Coaters can boost your production, reduce down-time, cut coating costs. These are heavy-duty machines, built rugged and rigid to *maintain* high quality production and trouble-free performance. Heavy distortion-free rolls apply *uniform* coatings — assure longer coating roll life. Chrome coated oversize doctor rolls give finer doctoring action.

Versatile, economical — Black's Roller Coaters apply lacquers, paints, sealers, varnishes, waxes, etc. to flat work such as wood, metal, plywood, composition board, hardwood, plastic, cardboard, cement board.

Write today for literature describing the oldest — most complete line of roller coating equipment, available with plus-value optional features to meet *your* finishing needs.

THE BLACK BROTHERS CO., INC.
Mendota 6, Illinois — *SINCE 1882*

About This Issue

The future of wood depends on us! This thought is not new: you will find it echoed throughout the pages of this issue. That future can open a door to new uses, new products, new combinations of wood and other materials and new applications which will utilize the whole range of wood properties.

The cover emphasizes the importance of wood to our American heritage. Wood species for the map are representative of softwoods, hardwoods, fine veneers and board products. There is no planned relationship between the geographical regions of the country and the species used to show that section. The map is symbolical of wood's traditional position as a versatile material that supplies many national needs. The diagram on this page identifies the species of woods.

The future of wood in our nation will rest to a great extent on the ability of the wood industry to produce better products and processes in order to compete successfully with other materials. Producers of aluminum, plastics, etc., look longingly toward the markets now held by wood. One of their favorite pieces of propaganda is slanted toward the newness of these competitive materials and implies that wood is old and undesirable.

Wood is one of the oldest materials known, but it is also a material that can meet our future needs. There is something new to say about wood. We've

tried to tell much of the story in this issue, but the complete story needs to be repeated.

We are in absolute agreement with Charles E. Young, economist, Weyerhaeuser Timber Co., when he said:

"By making use of the best technical brains and equipment available, by willingness to accept and promote change and to risk capital in new ventures, and by alert and aggressive mechandising . . . the major uses of wood can be maintained and even expanded. By the same token, those who are unable or unwilling to put forth the effort and expense required to meet stiff competition on all fronts will do well to keep their bags packed for an early departure from the scene."

—The Editor

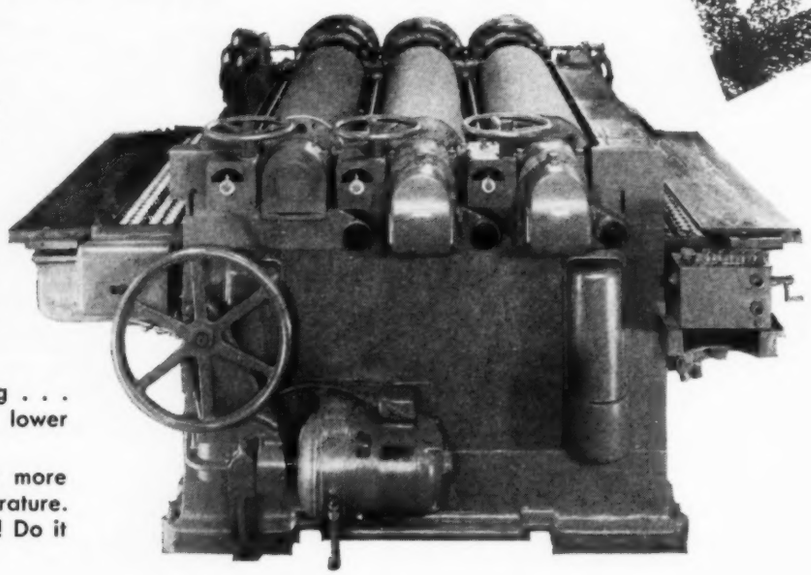
The Sander that Only a Specialist Could Build

EXCLUSIVE FEATURES on Smith 2, 3 and 4 Drum Endless Bed Sanders include:

- Self oscillating drum mechanism.
- Simple, positive BED adjustments.
- Simple, positive DRUM adjustments.
- Handy location of all hand wheels.
- Sanding thickness to close tolerances.
- Totally Enclosed Motors.

RESULTS: High quality sanding . . . Efficient Production . . . and lower costs

Write, telephone or wire for more information and helpful literature. Also ask about our lease plan! Do it today!



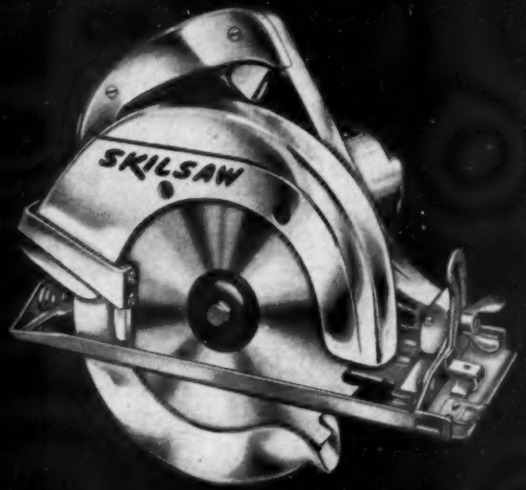
WOODWORKING MACHINERY MANUFACTURERS' ASSOCIATION WMMA

H. B. SMITH MACHINE CO.

BURLINGTON COUNTY, SMITHVILLE, NEW JERSEY

HI-TORQUE, **super-duty SKILSAW**—In-line rear handle and left-hand blade allows you to see line of cut. Exclusive hi-torque worm drive gives exceptional cutting power. Tough to stall anytime. Super duty saws with rear handle design come in eight models from 6½″ to 12″.

NEW HI-SPEED, **super-duty SKILSAW**—Completely new top-handle design for easy "swing-through" cuts. "Floating" blade guard and fast blade-change are exclusive new features. A total of 14 special features which add up to the most exciting new saw on the market today. Top-handle design available in 7¼″ and 8¼″ models.



ECONOMY MODEL, **heavy-duty SKILSAW**—Designed specifically for all-around use by carpenters or contractors in residential construction. Lightweight. Versatile. All heavy-duty models feature exclusive "Vari-Torque" clutch. Protects against blade kickback. Keeps motor in top running condition. There are five heavy-duty models with blade sizes from 4½″ to 8¼″.

WHICH SKIL SAW works best for you?

more proof of SKILMANSHIP*
ONLY SKIL MAKES ALL THREE

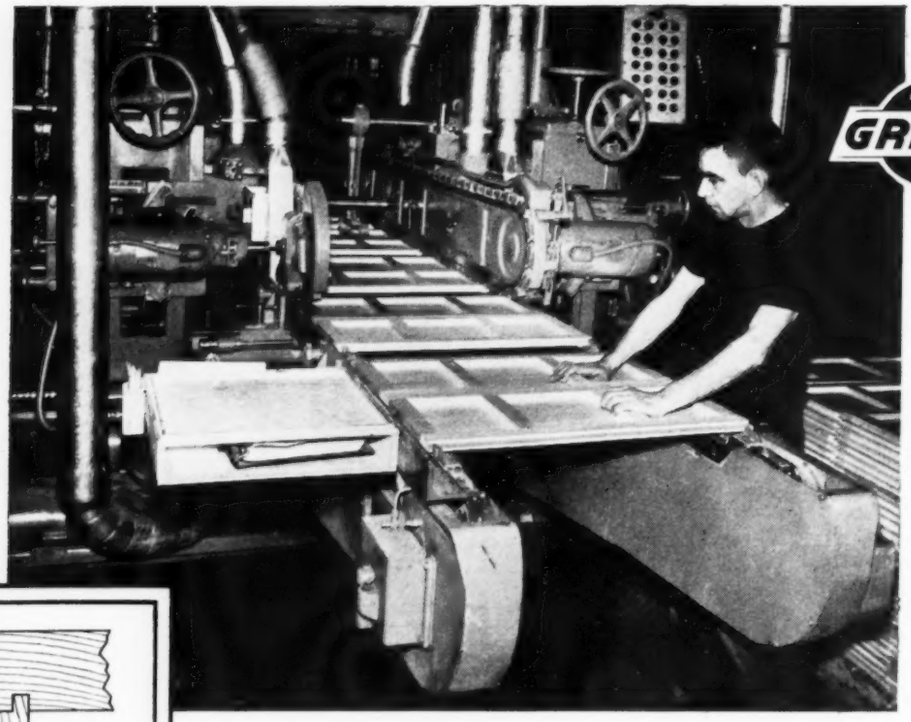
For more than 30 years SKIL has pioneered in the design of saws to meet the special needs of builders. Now, we offer the widest choice ever with the addition of a top-handle saw. Only from SKIL can you choose from three types. And remember this—no matter which model you buy, you always get the same superior performance that has made SKIL saw the favorite saw in the building field.

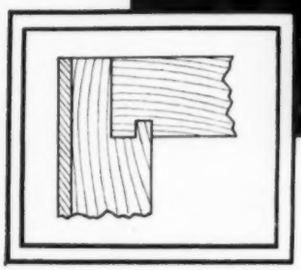
**SKILMANSHIP* is the ability to offer the finest portable saws for over 30 years—saws that do any job better, faster, easier.*

SKIL

Made only by SKIL Corporation, manufacturer of famous SKIL and SKILSAW products, 5033 Elston Avenue, Chicago 30, Illinois. In Canada: 3601 Dundas Street West, Toronto 9, Ontario.

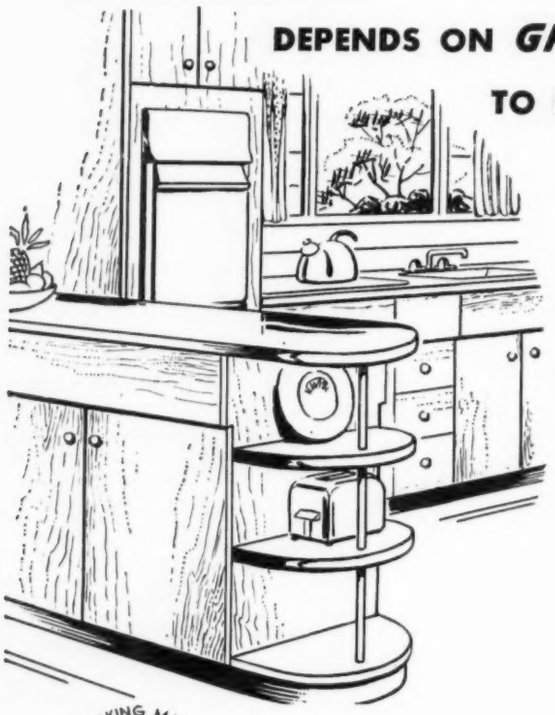
GREENLEE SPECIALIZED MACHINES PRODUCE GREATER PROFITS





MORGAN

DEPENDS ON *GREENLEE* No. 545 DOUBLE-END TENONER TO PRODUCE ACCURATE LOCK-CORNER JOINTS



Wood cabinets for kitchens manufactured by Morgan Company, Oshkosh, Wisconsin have many exclusive features. One of these is the Morgan self-aligning lock joint which makes assembly easy . . . holds cabinets true and square.

These joints are cut in the cabinet end-panels at the rate of 600 per hour on the Greenlee No. 545 Double-End Tenoner shown above. Necessarily, close tolerances are of utmost importance. On an average run of 20,000 pieces, plant officials say the Greenlee "545" will hold to .008" at all times.

Set-ups are easily and quickly made. Swinging pressure beams give complete access to the cutting heads, reducing down-time to a minimum.

Let us show you how the Greenlee No. 545 Double-End Tenoner can cut costs in your plant. Write today for complete information.

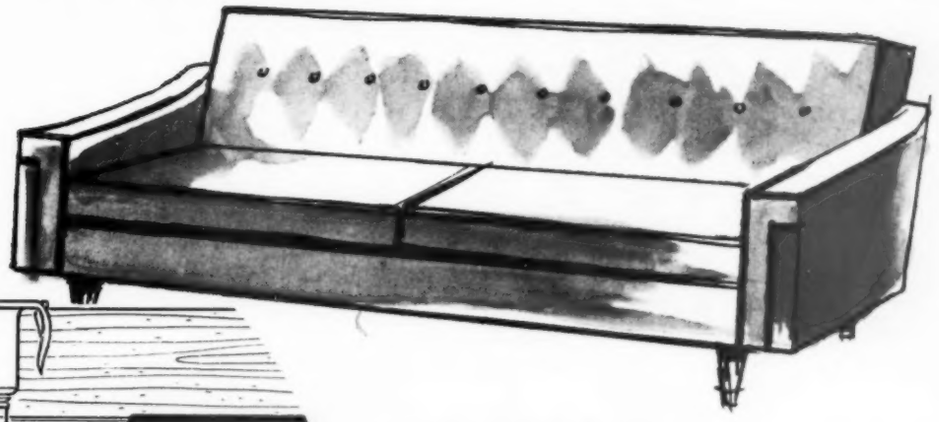
Put a Profit in Your Woodworking with Greenlee Machines

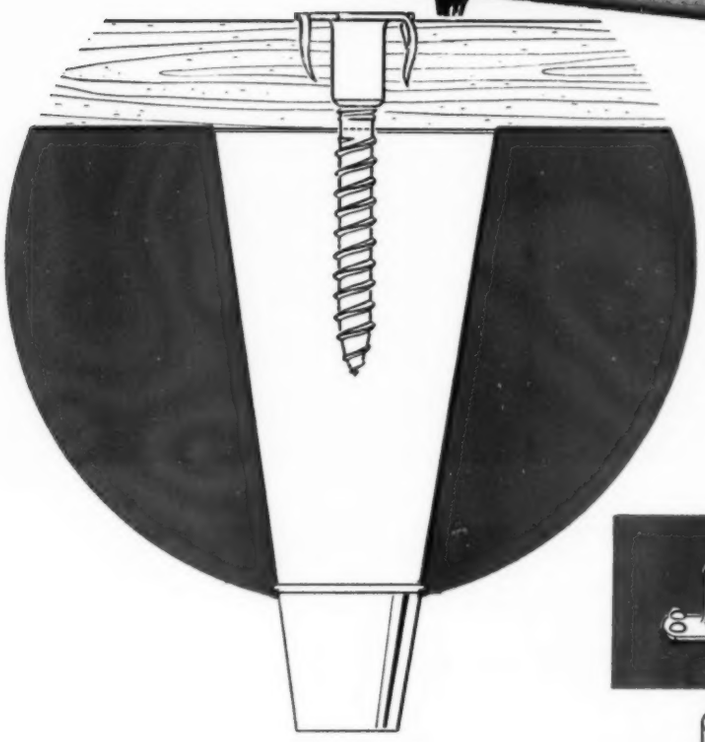
WOODWORKING MACHINERY MANUFACTURERS' ASSOCIATION WMMA

GREENLEE BROS. & CO.

1931 TWENTY-FIRST AVE.
ROCKFORD, ILL.

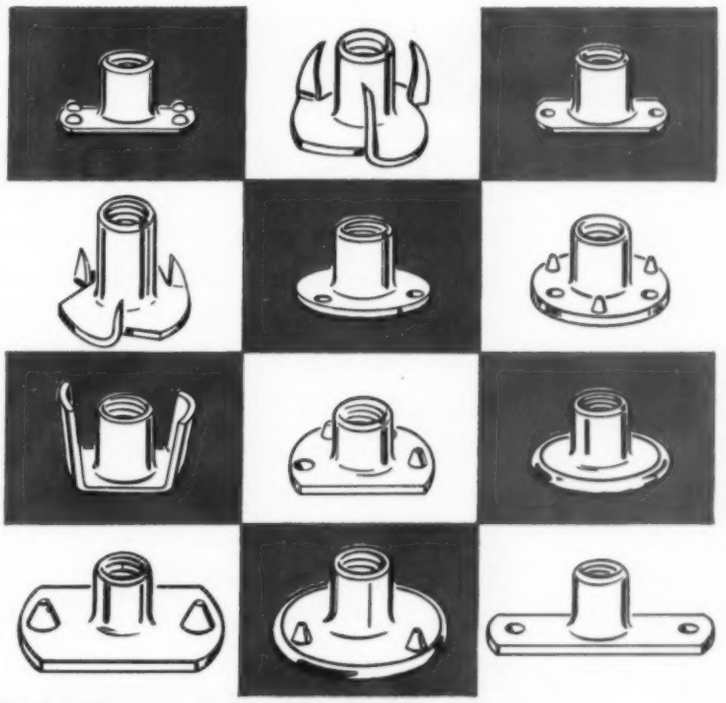
*TEENUTS®
in volume and variety





THE ORIGINAL HIGH STRENGTH BLIND FASTENER

Teenuts provide steel threads in wood and permit repeated assembly and disassembly without damage. Simply drill hole same size as Teenut barrel and hammer in the Teenut. Prongs penetrate deeply into wood and provide positive anchorage for common or hanger-type bolts screwed into barrel. Counter-boring permits completely flush mounting.



Illustrated are just a few of the more than six hundred different types of Teenuts available according to thread size, barrel length, mounting method and flange configuration. Teenuts are manufactured in volume for use with either wood or metal furniture and special types can be designed and produced to your specifications if volume warrants the cost of tooling. For further information, write for Engineering Data Catalog, Section E.

*The name TEENUTS is a registered trademark of United-Carr Fastener Corp.

CARR FASTENER COMPANY
Division of United-Carr Fastener Corp., Cambridge 42, Mass.

MAKERS OF DOT FASTENERS

for

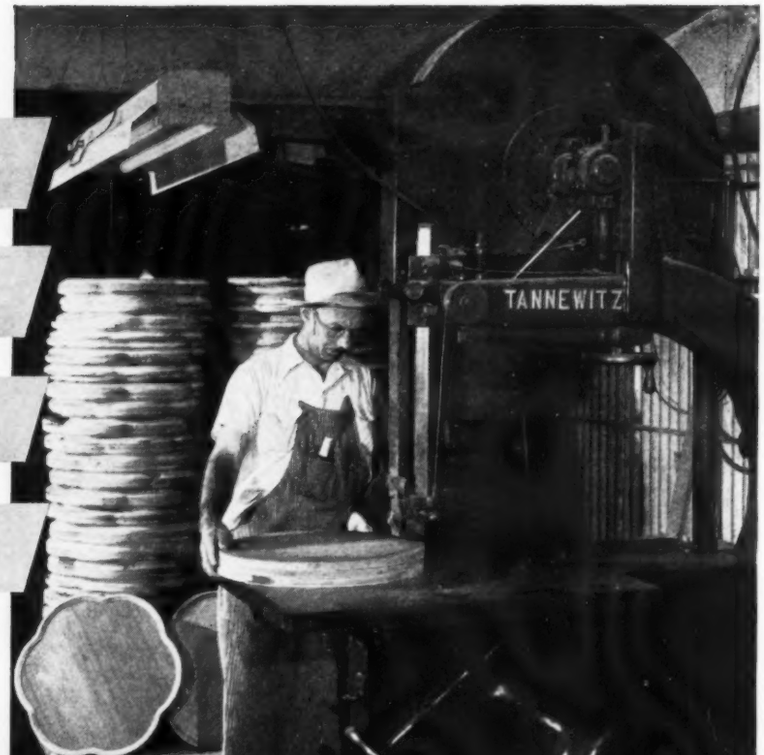
Smoother

Cleaner

Faster

Cutting

AND A LIFETIME OF TROUBLE-FREE SERVICE



buy

TANNEWITZ

HIGH SPEED BAND SAWS

The absolute precision with which these machines are built allows them to deliver over 12,000 feet of saw-blade travel per minute entirely without vibration. That means smoother, cleaner cuts requiring less cleanup; faster cuts, for at this speed the blade slides thru stock 12" or more thick as easy as butter. Traditional Tannewitz quality — the highest in the industry — and numerous patented features assure maximum convenience of operation and minimum maintenance. They're the best by any test — by far the cheapest in the long run. Write for "Band Saw Bulletins" and judge for yourself.

BUILT BY SAWING MACHINERY SPECIALISTS ☎ GL 6-1729

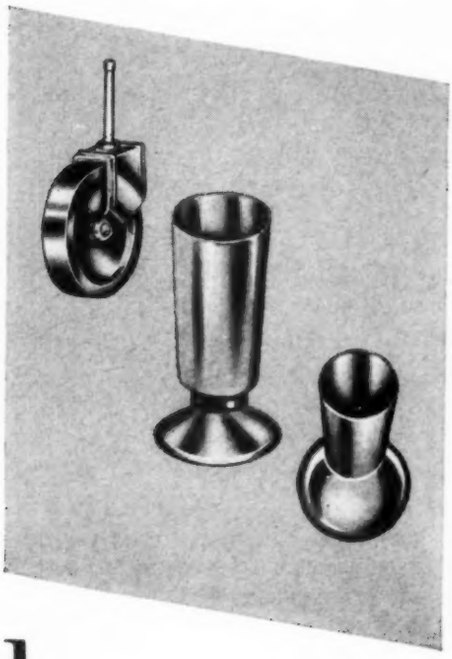
THE TANNEWITZ WORKS, Grand Rapids, Mich.

Complement

. . . your product with Hayden

FURNITURE HARDWARE

Nothing adds to distinctive furniture designs just like *Hayden* hardware. It complements the finest contemporary and traditional furniture; TV, radio and phonograph cabinets being produced today. *Hayden* hardware can be custom designed to your specifications or ordered from a wide selection of extraordinary stock patterns. *Hayden's* emphasis on high standards of design and product quality insures hardware that becomes an integral part of the furniture design. For that extra sales feature that helps win compliments for your product, specify *Hayden* . . . for the finishing touch.

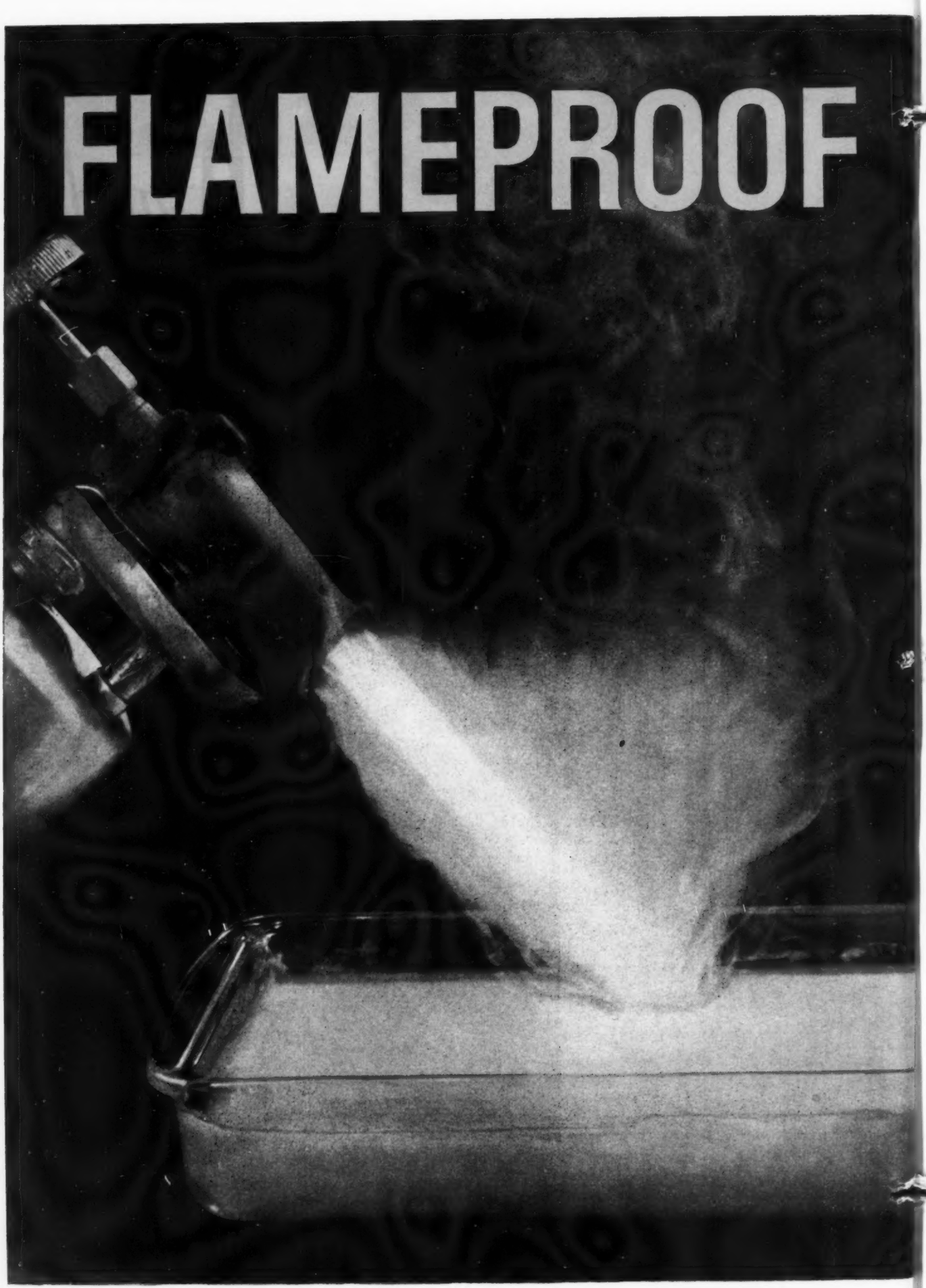


All *Hayden* products are available in a variety of *Haydenized guaranteed finishes:* Brushed or bright brass, silver, copper, pewter, antiqued old english, statuary and black oxidized. Whatever your needs for metal legs, ferrules, hinges, handles, drawer pulls, escutcheon plates and other furniture trim, you'll find the design and finish you desire at *Hayden*.

Write Today for free portfolio of *Hayden* designs or call for a sample and quotation on the product you need. Our designers, sales representatives and manufacturing facilities are at your service.

Hayden

MANUFACTURING COMPANY • Phone BRoadway 3-2222
EXECUTIVE OFFICES / **618 N. HARTREY STREET • EVANSTON, ILLINOIS**


FLAMEPROOF

NEW WATER-THINNED CONTACT CEMENT

Today! A completely safe contact cement. No flammable solvents. No flash fire hazard. No toxic vapors. A major advance in adhesive technology. Its name: WATER-THINNED INSTANT-LOK.

INSTANT BONDS—Water-thinned Instant-Lok produces strong, instant, creep-resistant bonds ideal for plastic laminating and other rapid assembly work. Bonds are highly heat and water-resistant. High strength is illustrated at right.

LOWER COST—Water-thinned Instant-Lok gives double the mileage of conventional contact cements, over 300 sq. ft. per gallon spread. Thinner glue coats bond wood, decorative plastic laminates, metals, etc., at lower overall cost.

EASY CLEANUP—Brushes, spray guns and rollers are easily cleaned with soapy water before adhesive film dries thus avoiding hazardous cleanup with flammable solvents.

FREE SAMPLE—We'll be glad to send a free sample and further information. Write telling us something of the use you have in mind.

BOND TEARS PLYWOOD

STRUCTURAL PRODUCTS DIVISION

National

STARCH PRODUCTS INC.

750 Third Avenue, New York 17 • 3641 So. Washtenaw Avenue, Chicago 32 • 735 Battery Street, San Francisco 11

Also, National Adhesives (Canada) Ltd., 371 Wallace Avenue, Toronto • P.O. Box 50 N.D.G., Montreal

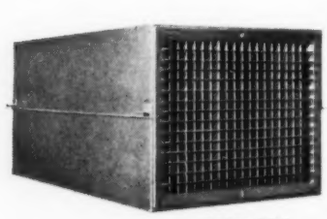
CONTROL HUMIDITY

THIS LOW-COST WAY

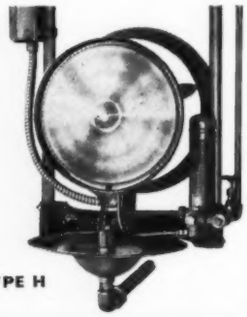
WITH *Guaranteed* Bahnson UNIT HUMIDIFIERS

prevents warping, splitting... improves finishing, gluing

Self-contained water or steam units cost as little as $10 per unit per year to operate. Installation can be singly or in groups, requires no floor space, little maintenance. Automatic controls, high capacity. A complete line of sizes and types to fit your needs.



TYPE SBA



TYPE H

HELPFUL FREE BOOKLET

contains money-saving answers to humidity problems in woodworking. Send for it today! Just clip coupon to letterhead and mail.

NAME_____

THE BAHNSON COMPANY

Winston-Salem, N.C. W-16

Letters to the Editor

If you are interested in contacting any of these readers, please write the editor.

"May we please have permission to use a cartoon about a metal desk which appeared in one of your winter numbers? This cartoon showed a shipwreck scene and comments about the safety of wooden desks."

—R. E., Maine

"Will you send me a sample copy of your magazine? I have just heard about it from a friend and would like to subscribe."

—J. S., Wis.

"One of our foremen is very much impressed with your monthly feature, 'RIGHT OR WRONG,' Could you please send me some extra tearsheets?"

—W. L., Illinois

"An article called 'Heat Treatment for Wood,' written by T. A. Dickinson in your January, 1955, edition was recently called to my attention. This subject is right in line with our own manufacturing operations on handles. Can you give us some additional information? We would also like to become a subscriber."

—C. H., Canada

"Just came across a November issue of your publication. The article on wide belt sanders by Harvey Bennett, Behr-Manning Corp., is very interesting. Can you supply additional information, or literature from companies having such a sander?"

—J. J., New York

"Please send me a copy of the article, 'Modern Shaper Collar Practice Insures Operator Safety,' by Robert H. Solem, the March issue of your good magazine."

—P. T., India

"We have a gluing problem in bonding single or two-ply veneers to the edges of lumber core plywood panels, such as oval and round table tops. A commercial product, manufactured in single ply about 1/28″ and 1/20″ material with a nylon fabric on the adhesive side, has not been satisfactory. . . . There surely must be some way of applying edge banding right without going back to animal glue and forms or presses. Is there a new contact adhesive that might work? Can you recommend something?"

—E. F., Indiana

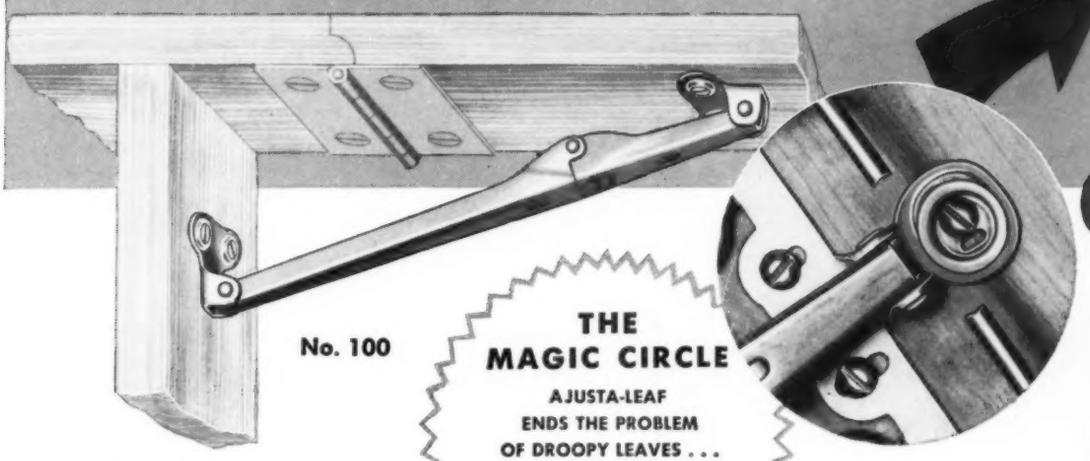
"Referring to an article in the July, 1958 issue, under the heading, 'Which is Better—To Chip or Trim?' we shall appreciate it very much if you can tell us where this equipment is in operation and how we can contact the plywood plant which is using it."

—M. W., Maryland

"Can you please advise us of manufacturers who are making machinery for blinds and louvered doors? It seems that some companies have discontinued this equipment."

—D. L., Indiana

New Sales Feature!

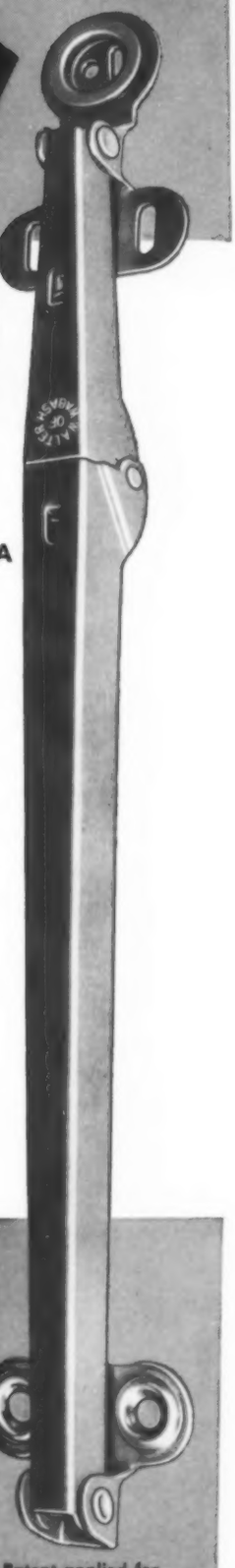


No. 100

THE MAGIC CIRCLE

AJUSTA-LEAF ENDS THE PROBLEM OF DROOPY LEAVES . . .

ANYONE CAN ADJUST THE SUPPORTS INSTANTLY WITH ONLY A SCREWDRIVER!



No. 100-A

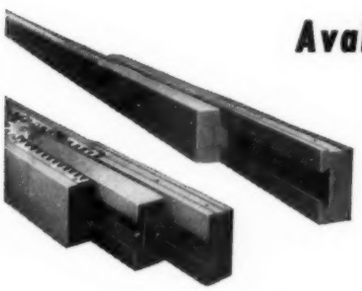
Wabash

Drop Leaf Supports

WITH AJUSTA-LEAF MAKE IT EASY TO LEVEL LEAF

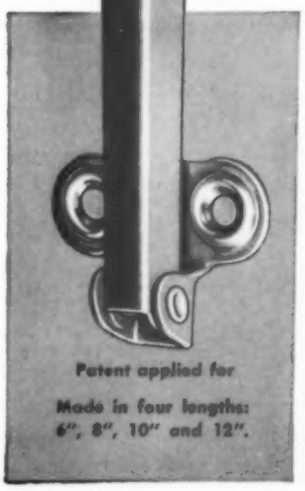
AJUSTA-LEAF, which makes it easy to level the leaf on a drop leaf table, is available on all Wabash Drop Leaf Supports. The Regular No. 100 Support is shown in the diagram above. No. 100-A, shown at right, has Ajusta-Leaf added. To adjust the leaves, simply loosen the screws in the Ajusta-Leaf bracket, level the leaf and tighten the screws.

Ajusta-Leaf is an amazingly valuable sales feature, so easy to understand that every consumer will appreciate its value, and so low in cost you cannot afford to manufacture tables without it.



Available on regular or self-releasing Drop Leaf Supports

Ajusta-Leaf is also available on Wabash Self-Releasing Drop Leaf Supports and on Supports for tables without rim. Write for more information and sample today.



Patent applied for

Made in four lengths: 6", 8", 10" and 12".

SLIDES • HARDWARE • SELF-RELEASING DROP LEAF SUPPORTS

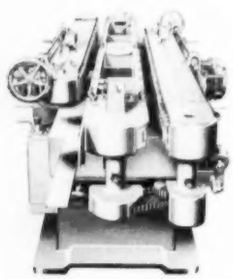
B. WALTER & COMPANY, Inc., WABASH, INDIANA

Walter of Wabash

DIEHL . . . Standard of Compon

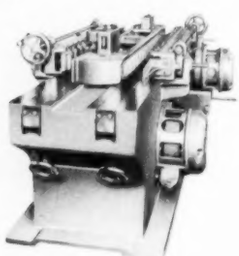
Model 800 Splicer

Designed for high-speed tapeless splicing of veneer, chipcore, solid lumber and cross banding. *Exclusive* design features new principle in tapeless splicing for all-time low production costs. Request Bul. 800.



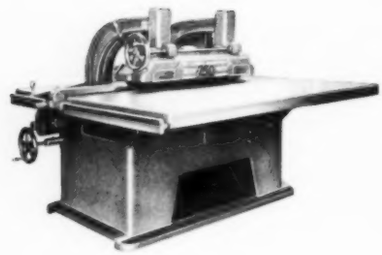
Model 69 Veneer Jointer

Handles mixed widths up to 2" thick at 16-25-33-50 fpm. Motorized pressure bar optional . . . for faster, more economical production. Two-way feed principle lets operators turn bundle and feed back through after one side is completed. Provides clean, sharp, straight joints at all times. Request literature.



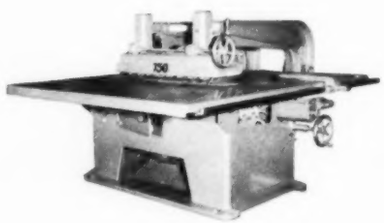
Model 660 Lumber Jointer and Edge Moulder

Features speeds up to 100 fpm. of precision joints or mouldings. Two-way feed principle permits feed back through after one side is completed. Automatic return feeder readily adaptable. Handles work up to 4½" thick. Request literature.



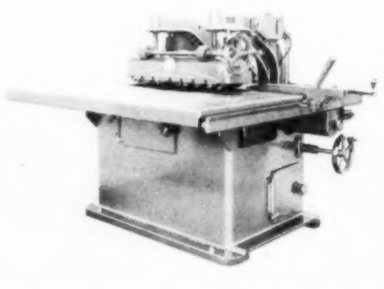
Model 750 Glue Joint Rip Saw

Especially designed for high-speed precision sawing. Standard feed speeds 58-90-120-180 fpm., with 250 fpm. available. Width of table at right of saw, 25". Heavy welded base houses electrical equipment. Brass chain race inserts and forced feed lubrication optional. Request Bul. 750.



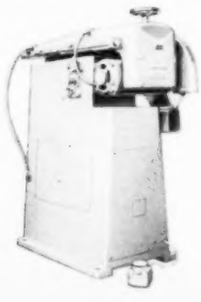
Model 750 Wide-Arm Glue Joint Rip Saw

Designed principally for plywood and chipcore sizing. Features same feed speeds as 750 and similar construction— but with 48" usable throat clearance. Brass chain race inserts and forced feed lubrication optional. Bul. WA-750.



Model 55 Glue Joint Rip Saw

Low cost . . . high quality . . . perfect glue joints straight from the saw. Standard feed speeds 40-60-80-120 fpm., with 250 fpm. available. All components mounted directly to rigid main frame for smooth, quiet, precision operation. Request Bul. 55.

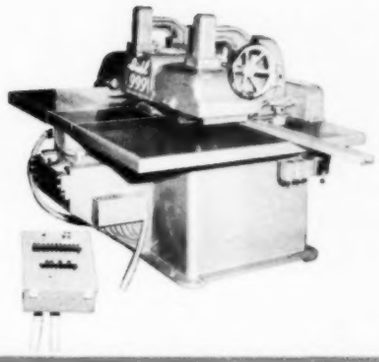


Model 725 Cut-Off Saw

Automatic air-operated unit offers precision accuracy at all speeds with safe, easy, flexible controls. Saw head vertical adjustment is 3". Cuts 1" stock up to 22" width. Cuts 4" stock up to 16" width. Request Bul. 725.

...oon in the Woodworking Industry

Model 999 Multi-Rip Saw



...pre-...eeds ...fpm. ...saw, ...ectri-...serts ...onal. New two-saw edger for precision ripping. Parallel rips random widths up to 200 fpm. Features one fixed blade, one movable blade, with automatic pre-positioning from remote control panel. Width selection in ⅛" increments to 12⅞" max. width. Request Bul. 999.

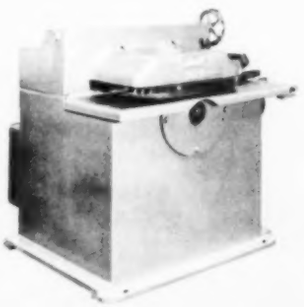
Model 99 Multi-Rip Saw

...and ...feed ...on— ...nce. ...feed ... Offers 8 speeds from 50 to 180 fpm.; special speeds if desired. Designed for precision gang ripping of stock from ¼" to 3¼" thick. Equipped with double kick-back guards, movable rip fence and throat plate cutting attachment. Bul. 99.

Model 990 Multi-Rip Saw

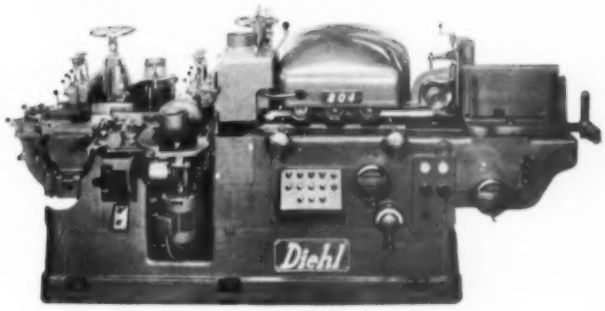
...glue ...dard ...with ...ments ...e for ...Re- Offers 8 speeds from 50 to 180 fpm.; special speeds if desired. Designed for precision gang ripping of stock from ¼" to 4¼" thick. Equipped with double kick-back guards, movable rip fence and throat plate cutting attachment. Bul. 99.

Model 909 Multi-Rip Saw

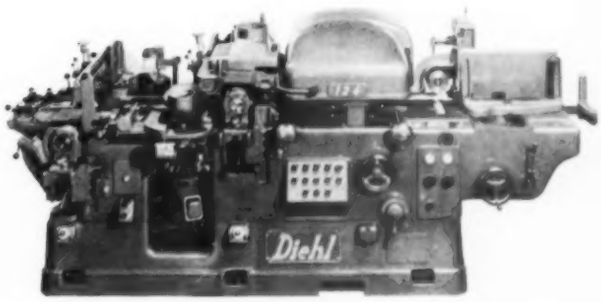


...reci- ...afe, ...erti- ...idth For precision high-speed gang ripping of stock from ⅛" to 2½" thick. Standard speed range from 50 to 115 fpm.; optional speeds to 153 fpm. Features ...able table, hinged feed roll cover, quickly adjustable stock gauge and easily removable saw and spur sleeves. Request Bul. MRS 909.

MOULDERS



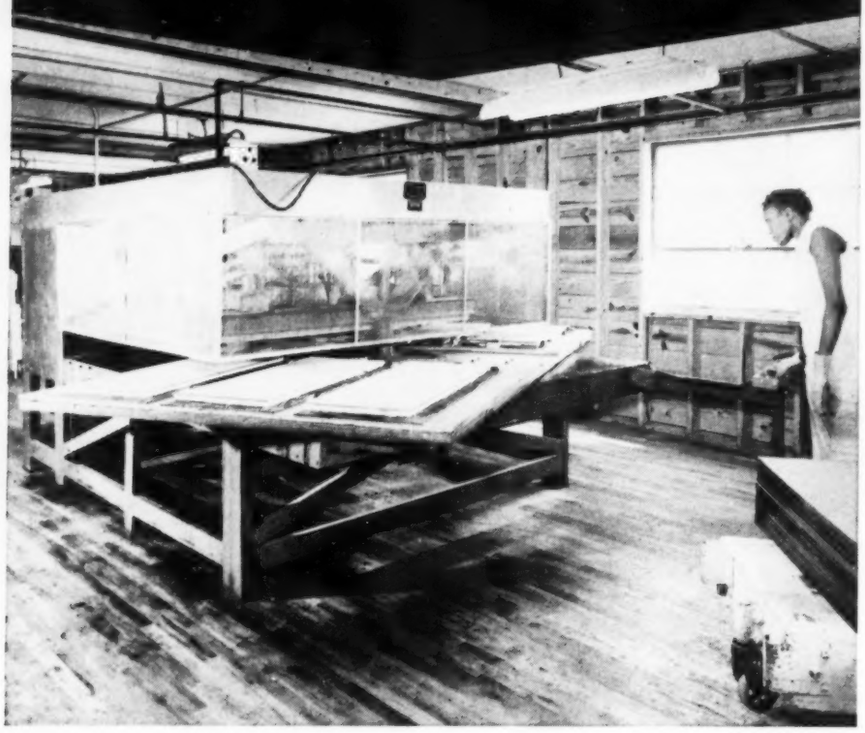
Newest Diehl Moulders are Models 124, 804 and 604 (12", 8" and 6" sizes, respectively). Each size is available in 4 cutterhead or 5 cutterhead models. Models with 5 cutterheads may be arranged with either 2 on top or 2 on bottom. These are heavy, rigid machines for high-speed continuous operation. All operating parts are built to clock-work precision . . . for cleanest possible cutting and the most uniform regularity ever known! Request Bul. M-657 for Model 124—Bul. M-957 for Models 804 and 604.



Diehl

THE G. M. DIEHL MACHINE WORKS, INC.
WABASH, INDIANA, U.S.A.

Here's why UNION ROTO-GLUERS® cut glue room costs



High-frequency electronic Union ROTO-GLUERS are truly the answer to boosting production and cutting costs for glued-up panels, panel-to-frame gluing and edge gluing. This revolutionary table pivot action is the first in industry. It outperforms clamp-type methods up to 300% . . . gives smooth flat work without hand-clamping or positioning.

ROTO-GLUERS create no excessive glue squeeze-out, reducing machining and sanding, improving quality and uniformity. They cut over-all costs through reduction of inventory and storage space.

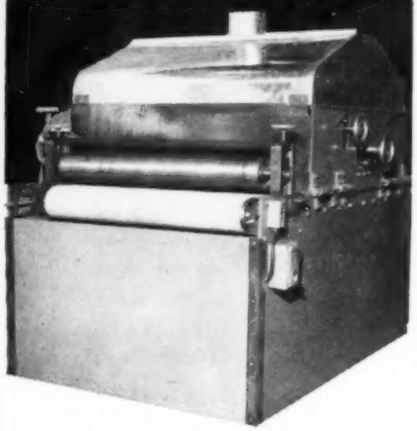
ROTO-GLUERS feature finger-tip control, one man operation, and automatic timing . . . plus air-operated top and side cylinders as optional equipment. They are simple, rugged machines built for years of service with a minimum of maintenance.

For complete details on Union ROTO-GLUERS and Union's complete line of high-frequency electronic woodworking machines, write for Bulletin HF-256.

UNION-WALLACE-INDIANA . . . A MANUFACTURING GROUP DEVOTED TO PRODUCING THE HIGHEST QUALITY WOODWORKING MACHINES.

THE
UNION TOOL CORPORATION
WARSAW, INDIANA

NEW! Indiana wide belt Sander



for rough sanding *or* fine finishing

Representing an innovation in wide belt sanding, this machine features two separate sanding areas. By simple adjustment of the head, a contact roll may be used for rough sanding, or a platen may be moved into position to do fine finishing. Stock is fed by continuous bed to the sanding head at a rate, variable from 30 to 105 feet per minute.

Accurately and easily controlled working pressures; ease of changing abrasive belts from rough sanding to polish sanding; automatic belt tracking; a rigid welded steel frame, balanced rolls, heavy-duty ball bearings, totally-enclosed motor and simple adjustment controls combine to make the machine vibrationless and trouble free, resulting in smoother finishes at higher rates of stock feed.

The Indiana sander represents the culmination of over 30 years experience in the design and development of sanding machines. Send in or bring in your samples so you can evaluate the extra quality finish and general sanding application for this sander in your operation.

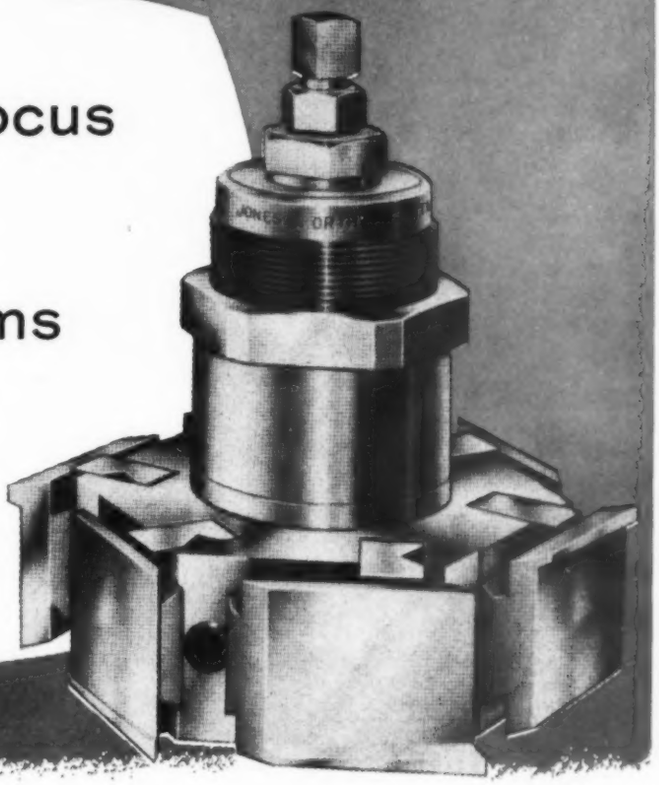
For information write or call . . .

500 W. Central Avenue Dept. D

INDIANA FOUNDRY, MACHINE & SUPPLY, INC.

BRAZIL, INDIANA

get a *local* focus on your *local* problems with J&O's NATION-WIDE EXPERIENCE



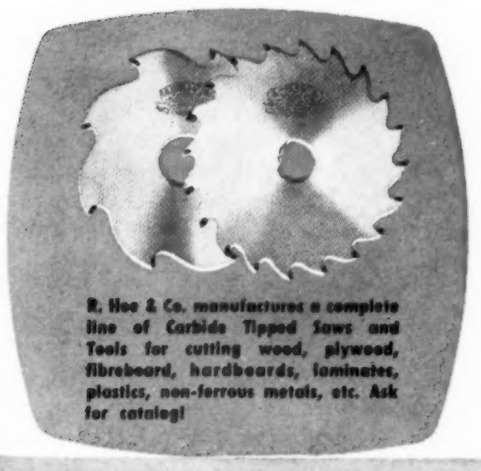
You heard us right . . . we have *almost* as much know-how on *your* local conditions affecting cutter head operation—as if we were right across the street from you.

We KNOW there's a lot of difference in regional factors affecting cutter head operation . . . and we know exactly what combination of specifications are predominantly favored in each area, thanks to our continuing analysis of more than 33 years of detailed job records covering every section of the country.

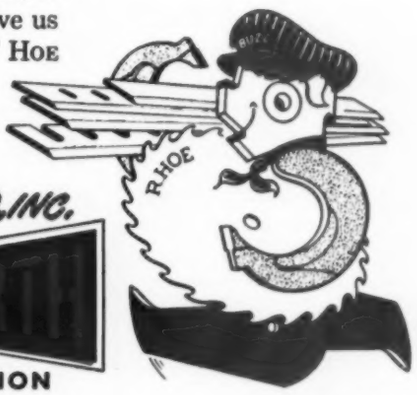
If you want top performance, and the fastest service to meet your local requirements, you can't match what J&O offers. Give us a chance to *prove* it?

"Buzz" Hoe

For manufacturing top grade eased edge dimensions, J&O's dependable H-Type Eased Edge Heads have long been favored in leading plants from coast to coast.



R. Hoe & Co. manufactures a complete line of Carbide Tipped Saws and Tools for cutting wood, plywood, fibreboard, hardboards, laminates, plastics, non-ferrous metals, etc. Ask for catalog!



R. HOE & CO. INC.

JONES & ORTH

CUTTER HEAD DIVISION

BOX 3523, SEATTLE 24, WASH.

HEADQUARTERS: 910 East 138th Street, New York 54, N. Y.

MANUFACTURING AND WAREHOUSE BRANCHES

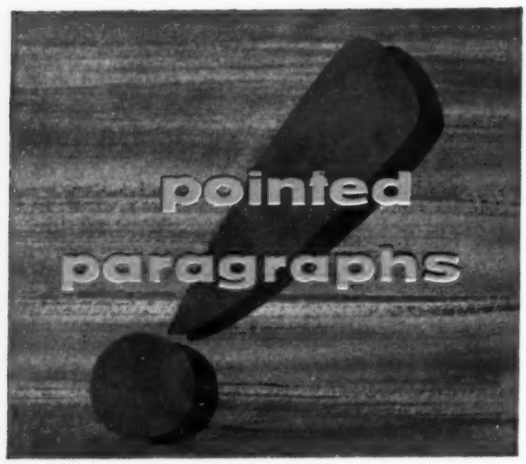
CHICAGO • BIRMINGHAM • MEMPHIS • SEATTLE

PORTLAND, ORE. • HIGH POINT, N. C.

©1957—R. HOE

C-4

CHISEL TOOTH SAWS • SOLID TOOTH CIRCULAR SAWS • BITS AND SHANKS • FILES
GRINDING WHEELS • METAL AND WOOD CUTTING BAND SAWS • CARBIDE TIPPED
SAWS AND TOOLS • CUTTER HEADS • SPECIAL FORM KNIVES • MACHINE KNIVES



Comments From The Editor

On New Products, Industry

Trends and Current Events

Playing a key role in the development of the Polaris guided missile for the U.S. navy were dummy missiles made of California redwood. Reasons for choosing redwood were the wood's strength, easy machinability to accurate dimension, and the fact that redwood would float and dummy missiles could be recovered for study.

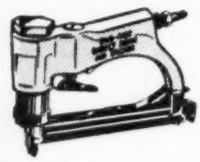
The National Institute of Wood Kitchen Cabinets is conducting a survey to discover: percentage of cabinets natural finished. Percentage enamel finished? How many cabinet companies manufacture their own counter tops; and what percentage of sales comes from new construction and what percentage from remodeling. The survey results may be completed by early winter.

Architectural woodwork manufacturers were told at their annual meeting in October that they have an opportunity to reap rewards unparalleled in our country's history, provided they step up their merchandising and promotional activities to meet the challenge of competitive materials. NLMA Executive Vice-President Mortimer B. Doyle was the speaker.

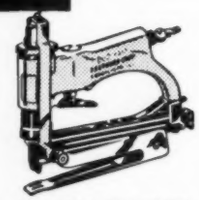
Forest Fiber Products Co., Forest Grove, Oregon, reports that an edge glued solid wood core to which Forest hardboard is laminated as facing material is gaining markets in the construction industry. Panels may be used for floor, wall and roof sections with other structural members.

Among new products made from wood are lamp shades. Some with brass trimmed, cabinet grained woods have just been introduced. During the day the shades blend with other woods. When lighted at night, the specially treated wood shade becomes translucent with the rich grain adding to the beauty and warmth of other wood furnishings.

DUO-FAST Tackers and Staplers for the WOODWORKING INDUSTRY



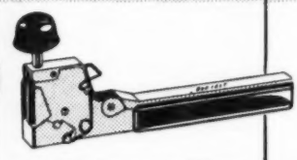
DUO-FAST AIR TACKERS
Fast, effortless, efficient tackers for production work. 20 various models.



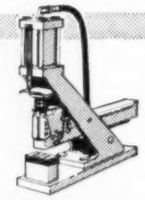
DUO-FAST AIR PLIER
Light, easily portable air-driven staplers. 8 various models.

DUO-FAST GUN TACKERS
Great all-purpose hand tackers. 18 various models.

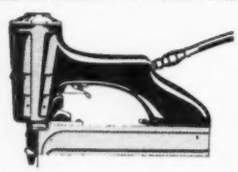
DUO-FAST HAMMER TACKERS
Fastest, manual tacking method. 6 various models.



DUO-FAST STRIKE TACKERS
Two-hand tackers for accurate placement of staples. 15 various models.



DUO-FAST BENCH MODELS
Air-operated staplers or tackers designed for bench-mounting. In single or multiple units. 11 various models.



NEW! DUO-FAST BRAD GUN
Sensational new tool drives brads 1" and 1¼" long, into the hardest materials, at 40 to 80 pounds air pressure. Remarkably light, easily-handled, and recoil-free. You just flick the triggers: air does the rest.

At Your Service . . .

Duo-Fast offers a complete line of Staplers, Tackers, and Staples–a Free Service Guarantee –and 50 sales and service offices to help you with your fastening problems.

Write for complete Duo-Fast Story.

DUO-FAST FASTENER CORPORATION
3752-54 River Road Franklin Park, Illinois

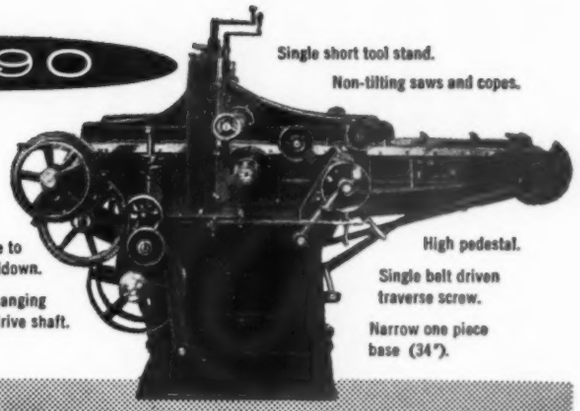
"GRANDDADDY" OF TENONERS

The Jenkins-Hayes No. 85
Double End Tenoning Machine

Built for the production needs of that day, the No. 85 with belt driven feed chains, saws and tenon arbors, and gear driven copes certainly wouldn't do the work demanded of tenoners today. Iron block holddowns . . . Babbitt bearings . . . narrow 34" base . . . limited tool adjustments . . . a 78" machine weighed 6500 pounds and measured 15' x 10'4" overall.

Basic design established

1890

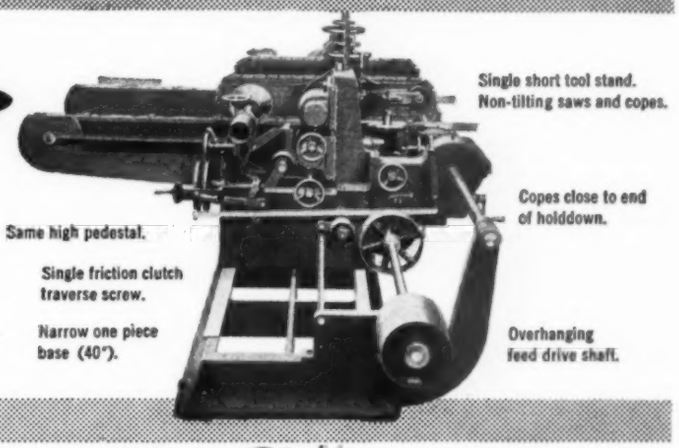

Single short tool stand.
Non-tilting saws and copes.
Copes close to end of holddown.
Overhanging feed drive shaft.
High pedestal.
Single belt driven traverse screw.
Narrow one piece base (34").

1916

The Jenkins No. 96 Belt Driven Double End Tenoner

A TON HEAVIER but basically the same.

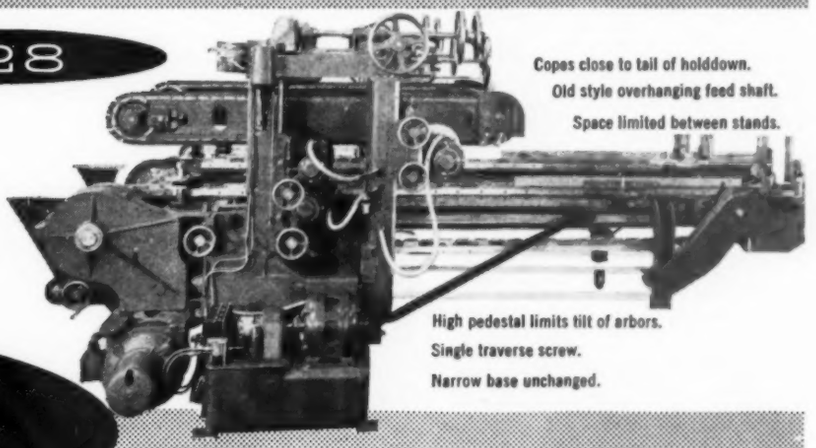
Some makes of Tenoners built today are not too different from this 1916 model. . . .


Single short tool stand.
Non-tilting saws and copes.
Copes close to end of holddown.
Same high pedestal.
Single friction clutch traverse screw.
Narrow one piece base (40").
Overhanging feed drive shaft.

1928

The Jenkins No. 90-95 Double End Tenoner Motor Driven, Ball Bearing

Double the weight of Jenkins-Hayes original, but basically same design. Improvements were in motorized 4 speed chain feed . . . motorized cutting tools . . . tilting saws (45° both ways) . . . tilting copes (45° toward chain) . . . power traverse . . . two short tool stands.

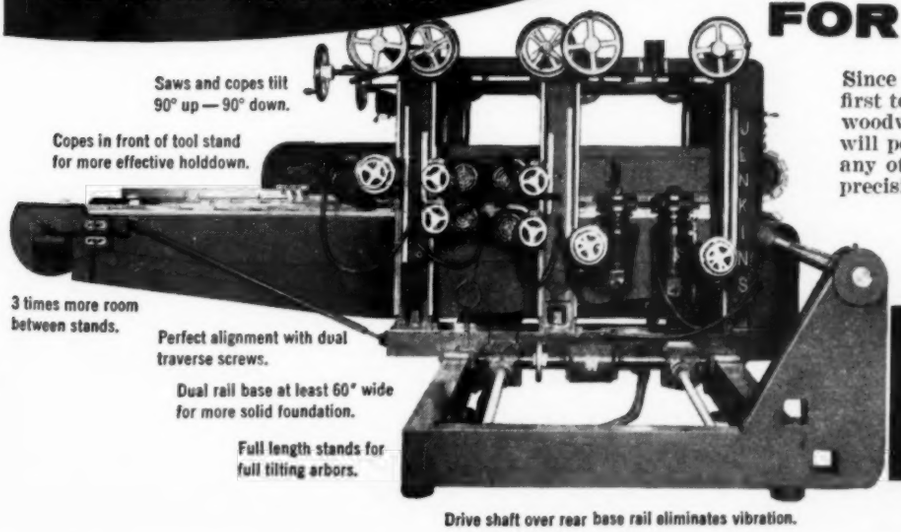

Copes close to tail of holddown.
Old style overhanging feed shaft.
Space limited between stands.
High pedestal limits tilt of arbors.
Single traverse screw.
Narrow base unchanged.

WHEN YOU SELECT A NEW TENONER

BE SURE IT'S MODERN
BE SURE IT'S JENKINS

THE JENKINS 193 DOUBLE END TENONER FOR 1958

Since 1890, when Jenkins' engineers built the first tenoner, they have lead the way to modern woodworking production. A Jenkins' Tenoner will perform more operations at one time than any other tenoner built today . . . with utmost precision . . . in less time and at less cost.


Saws and copes tilt 90° up — 90° down.
Copes in front of tool stand for more effective holddown.
3 times more room between stands.
Perfect alignment with dual traverse screws.
Dual rail base at least 60" wide for more solid foundation.
Full length stands for full tilting arbors.
Drive shaft over rear base rail eliminates vibration.

Jenkins WOODWORKING MACHINERY
Manufactured by
KOHLER-JOA CORPORATION
SHEBOYGAN FALLS WISCONSIN

*CARTRIDGE PROFILING

BUILT-IN AHEAD OF
OUT-FEED ROLLS.
CLOSELY COUPLES
ALL CUTTERHEADS.

An original cost reducing feature of Stetson-Ross Planer-Matchers for over 45 years

*Pre-set "cartridge" profile units built-in ahead of outfeed rolls give you highest quality millwork, and instantaneous pattern change through the use of spare "cartridge units." These are fundamentals of good machine design, developed and perfected by Stetson-Ross.

Touchup jointing of profile "Cartridges" on the machine, spring-loaded sectional pressure plates, on top profiler and numerous optional profile features have been available for many years on our machines.

For tomorrow's planing mill profits today, see Stetson-Ross!

STETSON–ROSS
MACHINE COMPANY INC.
SEATTLE 4, WASHINGTON

EXPORT DIVISION
301 CLAY STREET, SAN FRANCISCO, CALIFORNIA

problem:

TO RIP, GROOVE AND SHAPE COMPLETE DRAWER FRONT SETS IN ONE OPERATION regardless of contour.

solution:

WALTERS AUTOMATIC CONTOUR RIP AND GROOVING MACHINE

- INCREASES PRODUCTION and SAVES LABOR COSTS.
- ELIMINATES WASTE due to multiple handling.
- INSURES UNIFORM OPERATION set after set.
- FAST SET-UPS . . . only 3-4 minutes for 4-drawer set.
- SAVES PLANT SPACE by combining work of 3 machines into one operation.

WRITE FOR DETAILS OR CIRCLE READERS SERVICE CARD

WALTERS MFG. CO. P.O. BOX 405 MORRISTOWN, TENN.

When we Celebrate an **ANNIVERSARY...**

1898

1958

We Want To Share The Cake

In this sixtieth anniversary issue, *Hitchcock's WOOD WORKING* is passing out the cake: rather than emphasize our achievements. Through the efforts of our editors and many cooperative friends in the industry, we are serving you a liberal portion of information. This is more than a nostalgic review of the past—interesting as that may be. We've used outstanding editorial ingredients to give you some highlights in woodworking history; but the greatest emphasis is on what's happening today and what is going to happen tomorrow.

What is the future of our industry as seen by many experts? Men in research, suppliers of raw materials and manufacturers of wood products have told us of the present and the future in articles on finishing, assembly, machining and research.

While we are proud of our accomplishments and leadership, we believe that an anniversary issue should not be an occasion for self-glory. In fact, you'll find very little in these pages that reflects *our* accomplishments.

This issue is our tribute to the woodworking industry. We recognize the glorious past, but with unbounded enthusiasm our industry can look forward to a great future. Throughout the past years there have been new developments that could have been, and in some cases were, frightening. Some manufacturers who were confused and inflexible have disappeared from the scene. Those men, those companies and organizations who accepted the challenge of change have been successful. We can take a lesson from this past experience. Does the future of woodworking—with all of the unknowns that will come to light—challenge you? It should!

R. C. Van Kampen
Publisher

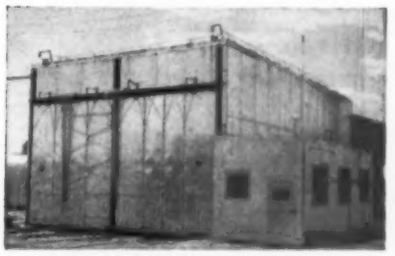
FOREST PRODUCTS COMPANY has stepped up to **STANDARD**—This installation at Albuquerque, New Mexico, consists of a gas-fired Standard prefabricated kiln which requires no boiler. Used primarily to dry Ponderosa pine, the kiln insures the quality of the firm's molding products.

Step up to STANDARD

for uniformly-dried lumber at lowest possible cost

● For any type of new kiln installation, or for remodeling of old natural draft kilns, call on Standard—manufacturers and designers of today's finest internal-fan kilns—to solve *your* drying requirements *best*. Write for information, and a free copy of our complete Equipment Catalog and Prefab Kiln Brochure.

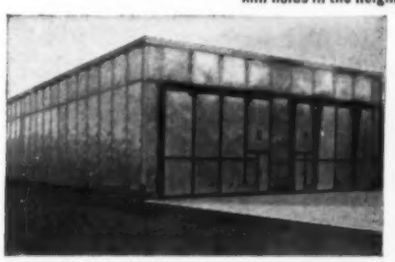
TELL CITY CHAIR COMPANY has stepped up to **STANDARD**—Located at Tell City, Indiana, this long-established firm reports: "We have been operating our two Standard package kilns since 1952, and are more than pleased with them. Their design gives better circulation and heat control than we ever achieved with our larger track kilns. We're able to segregate mixed loads and thus get maximum capacity."



CHAMA LUMBER COMPANY has stepped up to **STANDARD**—This Chama, New Mexico, firm has a Standard gas-fired prefabricated kiln. No boiler is required. Used mainly to dry Engelmann's spruce, the kiln holds in the neighborhood of 80,000 feet of lumber.

REMEMBER,

quality control starts with your dry kiln. Make sure it's the finest—make sure it's Standard.



CRAWFORD FURNITURE MANUFACTURING CORPORATION has stepped up to **STANDARD**—Crawford selected Standard prefabricated kilns for its modern furniture plant in New Bethlehem, Pa. Each of the two kilns is 20' wide x 100' long.

Manufacturers of Internal Fan Kilns

STANDARD
Engineers and Manufacturers Since 1887
DRY KILN COMPANY

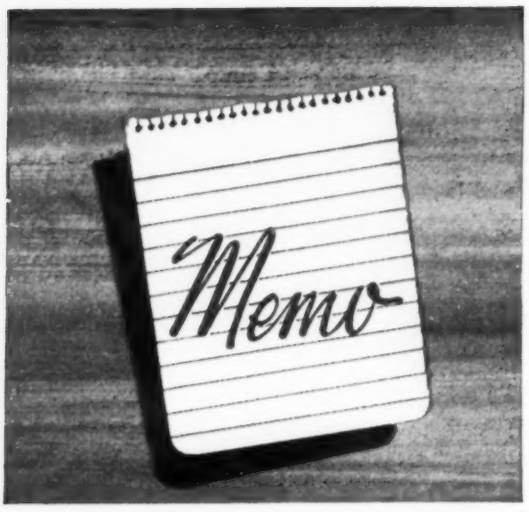
P. O. BOX 5708 • INDIANAPOLIS 21, INDIANA

STANDARD HAS THEM ALL

- Prefabricated Kilns
- Package Loaded Kilns
- Remodeled Kilns

OTHER QUALITY STANDARD PRODUCTS

Lumber Stackers • Dry Kiln Doors • Power Transfer Cars • Lumber Lifts • Kiln Trucks • Moisture Registers



to management

Business Outlook

Business recovery is continuing at a good pace. Production and sales rose further during September. Preliminary estimates show both personal income and consumption are higher. A quote from the monthly letter issued by the First National City Bank of New York City says, "Economic activity generally—as measured by gross national product—appears to have recovered roughly two thirds of the ground lost during the recession."

Recovery is not coming about because of activity in autos or capital goods. Automobiles will soon get into the picture, but present solid gains come from public works, homebuilding, defense outlays and most other lines.

Program to increase sale of office furniture is underway. The National Office Furniture Association has announced plans to persuade five million corporation executives and other businessmen to furnish offices in their homes. This sales drive was launched after a survey which showed 68% of business management executives take office work home at least one night a week. The association is stressing possible tax benefits from fitting out an office at home.

Taxes and Legislation

Intensified enforcement has been ordered on fictitious pricing in advertising copy. The Federal Trade Commission has issued a nine-point guide as to what the law permits and prohibits. There are nine major types of fictitious pricing. FTC Chairman John W. Gwynne said, "While our staff already has been hitting hard at those who lie about their bargain prices, we believe the problem is growing worse. Its solution calls for no less than a united effort by all groups—private, civic, state and Federal—to get price advertising claims back on a truthful level."

Housing legislation is expected to be one of the first issues taken up by Congress in January.

U. S. railroads may be developing a new plan which would offer "volume discounts" to shippers. The plan would be similar to one now in effect in both Canada and England. Designed to win back business lost to trucking concerns, the plan enables a railroad to approach a shipper with an offer to cut freight rates substantially, provided the railroad could prove to Federal regulatory officials that it was losing out to competing forms of transportation. Another condition would be that the shipper would have to agree to ship a large portion of his shipments via the railroad for at least a year.

Research

The "New Age of Architecture" should adequately define the next two decades. Leading architects, builders and planners believe that there will be great changes in the physical appearance of the U.S.—a period of design comparable to the Renaissance, Roman and Greek periods in architecture. Frank Lloyd Wright says that if our homes are of better design, such beauty of environment will do much to curb "teenage trouble." Good school design can lead our young people into an appreciation of better architectures.

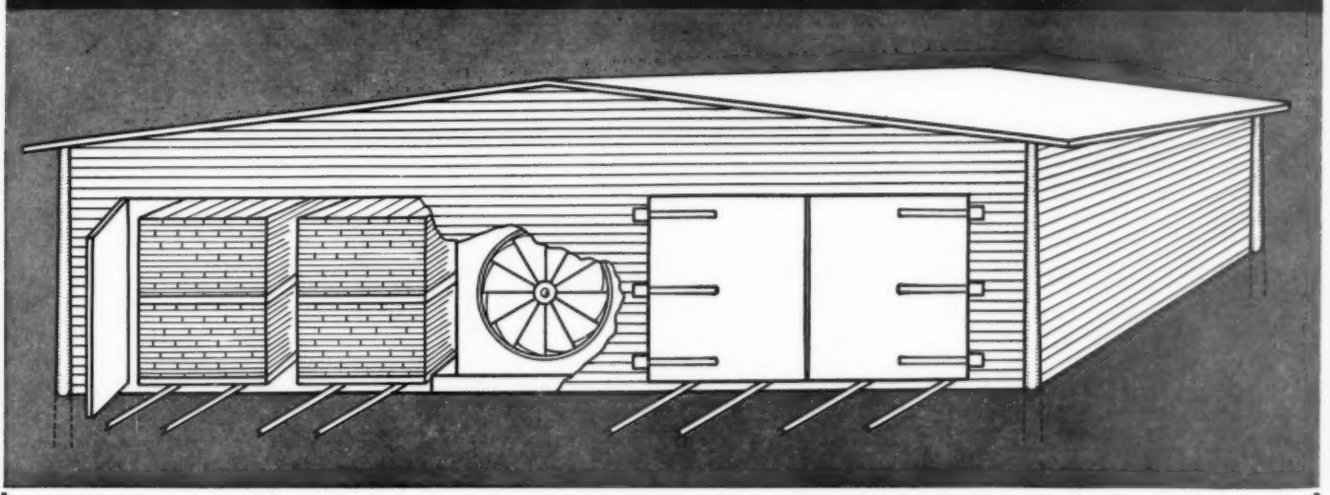
Here is a quotation from Mortimer B. Doyle which expresses this same thought, but slanted particularly for our industry: "As new generations of people and industry evolve, they must be made aware of the many qualities of wood that are beneficial to them. They must be convinced of the important part that wood plays in their everyday life. They must be given an opportunity to live, work, worship and learn in an atmosphere of wood—rather than a climate of competitive materials."

Shop by punchcard. It is entirely possible, according to two economists at Purdue University, that we can punch a card which has various items listed; send the card to the store and wait for the goods to be delivered. The retailer will put the cards into a Univac-like device and the machine will select the items.

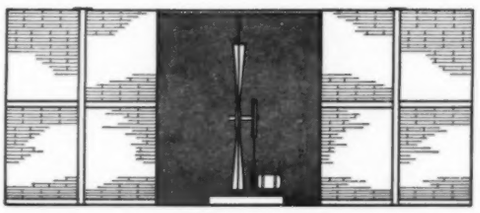
Supply delivery by ballistic cargo missile has been developed for the U.S. Army by Convair, Division of General Dynamics Corp. The missile which Convair calls "Lobber," can deliver rations, ammunition, medicines, communications equipment or other vital supplies. The missile and its launcher can be hand-carried by a team of three men in the field.

MOORE FORCED AIR DRYER

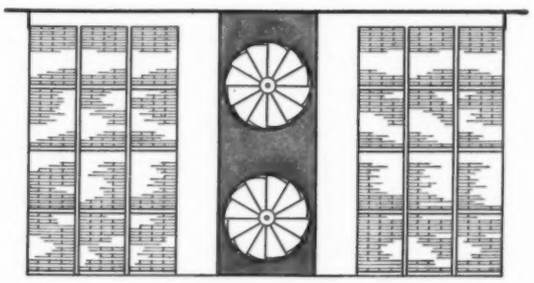
The NEW Low-Cost System For Drying Lumber



A Dryer for Any Capacity— 5000 Bd. Ft. and Up



This inexpensive design handles as little as 5000 bd. ft. For portable or permanent installation.



Moore Forced Air Dryer designed for large holding capacity. Other designs also available.

Here's the answer to a lumberman's prayer: A dependable, low-cost system to season pine and hardwoods to air-dried moisture content specifications.

The Moore Forced Air Dryer seasons 6 to 10 times faster than Mother Nature. Now you can ship lumber in a few days, at a fraction of the cost of handling and yard drying.

1—Produces brighter, flatter lumber (reduces stain and other yard drying defects)
2—Turns your inventory faster (money in your pocket)
3—Reduces shipping costs (don't pay freight on water)
4—Designed for loads on rails or unit packages
5—Increases existing kiln capacity (speeds air-drying before kiln drying)
6—Low equipment and building cost

Write today for estimate on a Moore Forced Air Dryer to fit your needs.

MOORE DRY KILN COMPANY

Oldest and Largest Manufacturers of Dry Kilns and Veneer Dryers

JACKSONVILLE FLORIDA | BRAMPTON, ONT. CANADA | VANCOUVER, B. C. CANADA | NORTH PORTLAND OREGON

for every $10,000 worth of lumber you now process—you can save up to $2,500 or more* with an

ONSRUD

FINGER JOINT SHAPER and ASSEMBLY MACHINE

Finger jointing makes money for you in two ways: (1) you can convert shorts now lost as scrap into usable, quality lumber and (2) you can buy lower grade lumber and upgrade it, giving you Select grades at practically No. 2 Common grade prices.

HERE'S WHAT THE MACHINES DO . . .

The Onsrud Finger Joint Shaper cuts finger joints in ends of boards by the work-and-turn method, applies glue automatically to one end and feeds the stock to the Assembly Machine. Only one operator required with most operations automatic. The Assembly Machine receives finger jointed and glued stock, runs it out and aligns it to form one long board, cuts off board to desired, pre-set length . . . and clamps it under pressure to make a firm, sound piece. Only one man required for operation. With these two machines (and they're low in cost) and only two men, you can reclaim shorts and upgrade thousands of feet of lumber per day.

HERE'S HOW TO FIGURE THE MONEY YOU CAN SAVE!

It's easy to figure what finger jointing can do for you. Calculate the Output of the machines in board feet per day . . . multiply this by the value in dollars per thousand board feet of lumber produced . . . and subtract the value of the scrap (in short reclamation) or lower class lumber (if upgrading) and the cost of finger jointing operations.

OUTPUT OF THE MACHINES IN BOARD FEET PER DAY

While the number of pieces finger jointed per minute will vary with length of the piece and the species being cut, you can take as an average 18 cuts per minute as the production rate. To compute Output: take average length of stock fed into machine in inches . . . multiply this by 18 . . . multiply this by 200 . . . and divide answer by 12. This will give lineal feet of lumber produced per day. Convert this to board feet, dividing as necessary depending upon thickness and width of lumber used. The number "200" above results from using "50 minutes" for every hour or 400 for eight hours. On single shaper production lines each piece of stock is fed through twice to produce finger joints at each end, the "400" is divided in two to give "200" as a multiplication factor. When two shapers are used to feed one assembly machine, stock is not handled twice, and a "400" multiplication factor may be used.

OUTPUT VALUE OF FINGER JOINTED LUMBER

Multiply board feet produced per day by price you would have to pay per thousand board feet for equal quantity of lumber of equal grade.

INPUT VALUE OF MATERIALS AND COST OF OPERATION

Take the value of the scrap stock (in reclamation) or the cost of the lower grade lumber you buy (in upgrading) . . . add to this the cost of labor (eight hours for each of two men) and supplies (about $20.00 per day as an average figure) . . . and this will give you total of input value and operating costs.

HERE ARE TWO EXAMPLES OF HOW MONEY WAS SAVED AND MADE

SAVINGS STUDY NO. 1

Salvage operation for core stock manufacturer . . . reclaiming shorts of various widths from 3" to 5", 4/4 basswood, in 8" to 24" lengths . . . average length 16". Stock is sorted to width prior to finger jointing. Two men, one finger joint shaper, one assembly machine set-up.

OUTPUT OF MACHINES

$\frac{16" \times 18 \times 200}{12}$ = 4,800 lineal feet per day

= 1,600 board feet per day

OUTPUT VALUE

Market value for FAS 4/4 basswood $175.00 per thousand board feet.

1.6 x $175.00 = $280.00 per day

INPUT VALUE AND COST OF OPERATION

Scrap value estimated at $40.00 per thousand board feet.

1.6 x $40.00 = $64.00 per day

Cost of sorting, prior to finger jointing . . . nothing . . . done by man feeding assembly machine	00.00
Machine operators, two men at $2.00 per hour per man, each 8 hours per day	32.00
Operating supplies . . . power, head maintenance, glue and miscellaneous (floor space not included)	20.00
Total	$116.00 per day

NET SAVINGS

$280.00 (output value) less $116.00 = $164.00 per day net savings. Projected for a full year's savings, based on a 5 day week and 48 week year . . . total savings $39,360 per year on a $14,000 machinery investment.

SAVINGS STUDY NO. 2

Upgrading operation . . . moulding plant using 4/4, 3" wide #2 Shop White Pine, upgraded to equal Select grade. Rip and defect lumber prior to finger jointing. Average stock length 30". Four man, two finger joint shaper, one assembly machine set-up.

OUTPUT OF MACHINES

$\frac{30" \times 18 \times 400 \text{ (for two machines)}}{12}$ = 18,000 lineal feet per day.

= 4,500 board feet per day.

OUTPUT VALUE

Market value of Select White Pine $230.00 per thousand board feet.

4.5 x $230.00 = $1,035.00

INPUT VALUE AND COST OF OPERATION

Market value of #2 Shop White Pine used, $100.00 per thousand board feet. Since a 20% loss occurs in defecting, 5,600 board feet are required to obtain 4,500 board feet for end jointing.

5.6 x $100.00 = $560.00 per day

Machine operators, four men at $2.00 per hour, each 8 hours per day	64.00
Operating supplies . . . power, head maintenance, glue and miscellaneous (floor space not included)	40.00
Total	$664.00 per day

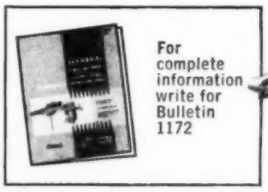
NET SAVINGS

$1,035.00 (output value) less $664.00 = $371.00 per day net savings. Projected for full year, based on a 5 day week and 48 week year . . . total savings $89,040 per year on a $21,000 machinery investment.

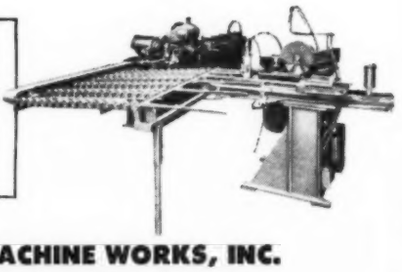
PROVE IT TO YOURSELF BEFORE YOU BUY!

Actual machines are set up at the Onsrud plant and will be available in other selected locations for your use. Run your actual stock through these machines and obtain an exact measure of productivity and the money you will save.

YOUR INQUIRY IS CORDIALLY INVITED . . . here's the most unusual opportunity ever offered in woodworking to obtain machines that will pay for themselves in a few months time . . . and make sizeable profits for you from that point on. Why not write us today . . . or pick up your phone and call us collect (ask for Bob Miller, Sales Manager).



For complete information write for Bulletin 1172



ONSRUD MACHINE WORKS, INC.

Woodworking Machinery Division

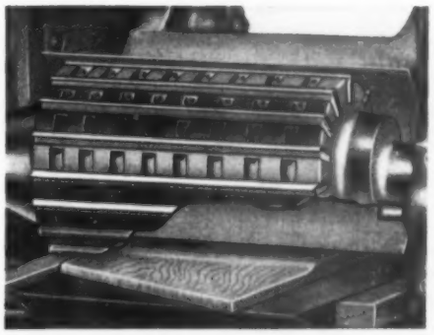
7742 Lehigh Avenue • Niles 48, Illinois

(Suburb of Chicago)

*depending upon type and grade of lumber you use.

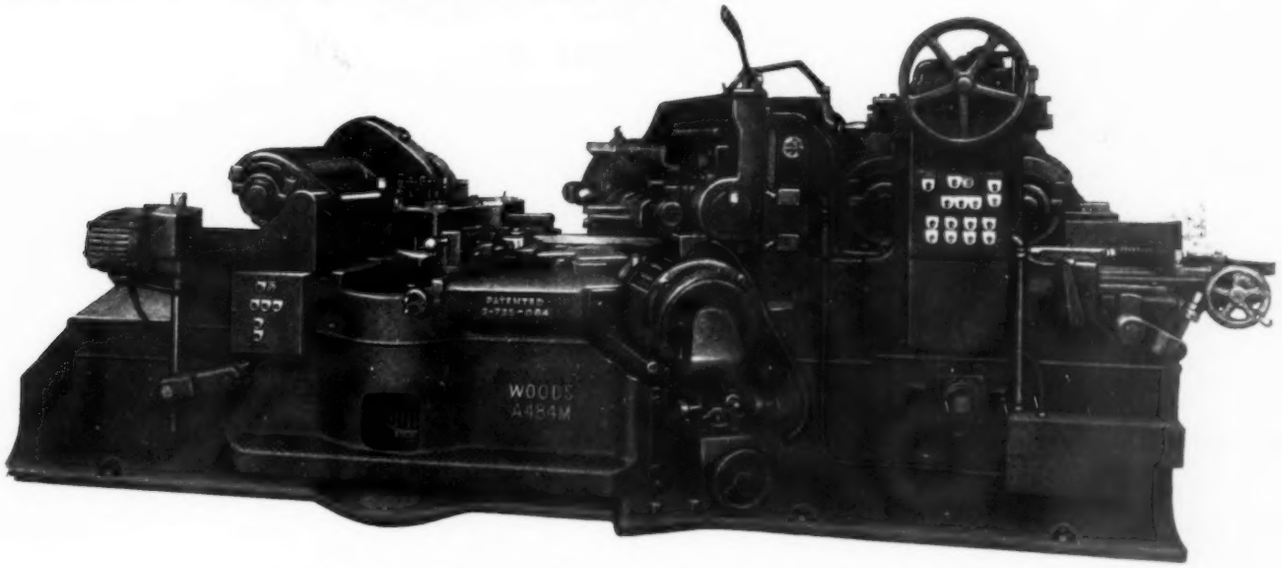
Serving the Industry Since 1852

The NEW SLANT on LUMBER FINISHING . . .



ANOTHER EXCLUSIVE FEATURE
Note how sniped ends are eliminated by mounting Top Cutterhead Unit diagonally to the Main Guide, presenting a SHEER CUT to stock under Top Cylinder. It also gives a smoother finish around knots and cross grain. Less power is needed to feed stock.

. . . *is* WOODS *Revolutionary* A-484M DIAGONAL PLANER and MATCHER



Upgrading of all stock, with astonishing improvement in finish on the lower grades now made possible with this revolutionary DIAGONAL PLANER and MATCHER.

Write today for the A484-M Booklet

S. A. WOODS MACHINE CO.
27 DAMRELL STREET
BOSTON 27, MASS.

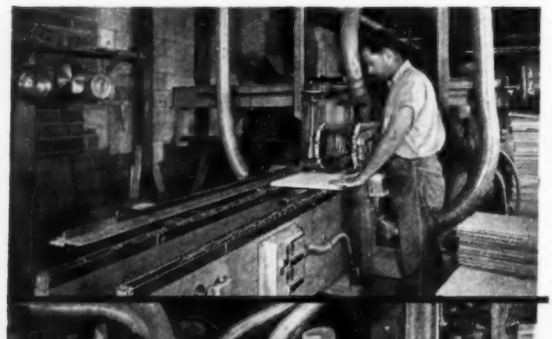
Cost Picture Improves 75% For TV Cabinet Maker

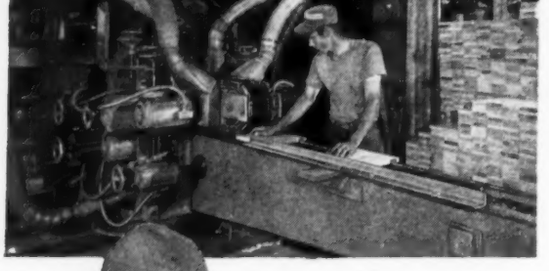
Mereen-Johnson 441-A Gang Rip Saw Sizes 7,000 board ft. per shift ready for gluing!

"Our Mereen-Johnson 441-A Gang Rip Saw has not only increased production and reduced labor costs, but it cuts wood for a perfect glue joint without further processing," says Victor Knies, production manager for Jasper Corp., Jasper, Indiana.

"The accuracy of the cut means ripped lumber can go directly to the gluing operation where it is joined together to form plywood cores. The machine is so adaptable, that it cuts wood in any width. We make about four changes daily with hardly any production stoppage."

"This single machine operated by two men replaces three straight-line saws formerly manned by six men. With the M-J 441-A we rip about 7,000 feet a day whereas we formerly were able to get only about 4,000 feet using three machines."





Mereen-Johnson Accuracy Assures Quality Contract Work

"TV and HI-FI cabinets must meet strict specifications. An imperfect joint that causes weakened construction, or an inaccurate cut that interferes with the installation of electronic equipment, means a failure to fulfill. This is where our two M-J 600 Double Cut-Off Saws and No. 700 Double End Tenoner play vital roles."

"The Double End Tenoner is one of our most versatile machines for tenons, copes, dados and mitres. Because each of our finished cabinets utilizes wood that is cut in 13 to 15 different ways, this machine performs an important function. In use over five years, *we have never had any downtime on it!*"

MEREEN-JOHNSON MACHINE CO.

4401 LYNDALE AVE. N.
MINNEAPOLIS 12, MINN.

Write for Bulletin

Victor Knies, Prod. Mgr. at Jasper Corporation, shows typical cuts made on a Mereen-Johnson 441-A Gang Rip Saw.

The WORLD'S LARGEST FLAKEBOARD PLANT NOW IN OPERATION

By Darrell Ward
Field Editor

"Man does not live by bread alone." Many things and various ingredients are required for comfortable living beyond the primitive stage. Wood is, perhaps, second or third to food and water, in one form or another at every stage of life, primitive and otherwise.

No one need fear that wood will be completely replaced by other materials. If any fears about wood are to be realistic, they might relate more directly to depletion of natural resources than to elimination of products made of wood. They might relate more directly to changes in the forms of wood utilization than to diminished needs for the raw material.

We do not have to look back even 60 years to recall many fears about wood being replaced. But, those fears have existed all along. Great fears of destruction often turn into rude awakenings of new constructions or expansion far beyond the inhibited imaginations of a mind filled with fear. This probably holds true for wood more than many things.

Even the plastics industry is not independent of the basic need for wood. The Formica Corporation, one of the world's largest plastics manufacturers, has always been somewhat associated with wood because of its distribution system through lumber and building supply outlets. The company now has entered the field far more deeply with the world's largest plant to turn out the greatest capacity production of particle board, one of the newest and most controversial forms of wood utilization.

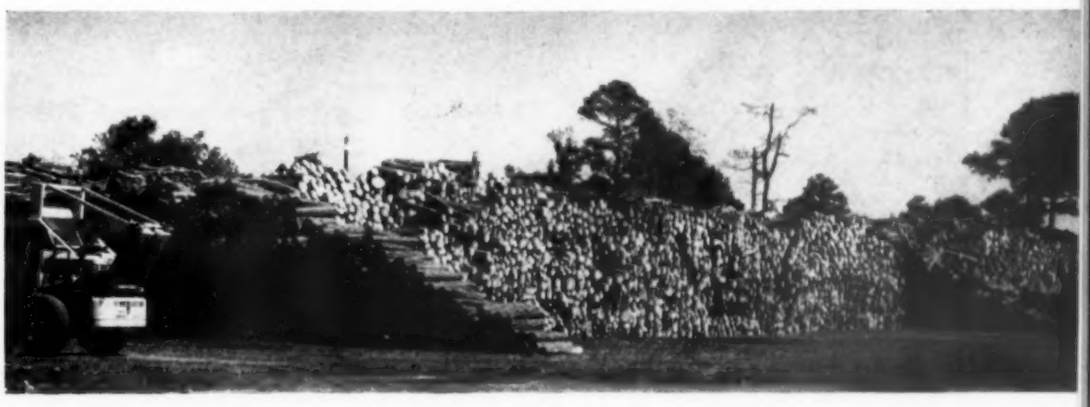
► *HOW DID A COMPANY OF THIS SIZE AND KIND BECOME INVOLVED IN WOOD?*

Formica originally was a thick, black industrial material used as electrical insulation and for panels. The company supplied ¼" thick panels for radio amateurs back in the 1920's. A later development was veneered in thinner sheets of the same material to make more economical panels.

During the 1930's, American Cyanamid developed melamine resin, a material highly resistant to abrasion and heat. Formica used this to develop decorative laminates. The first popular uses were for counter tops and table tops.

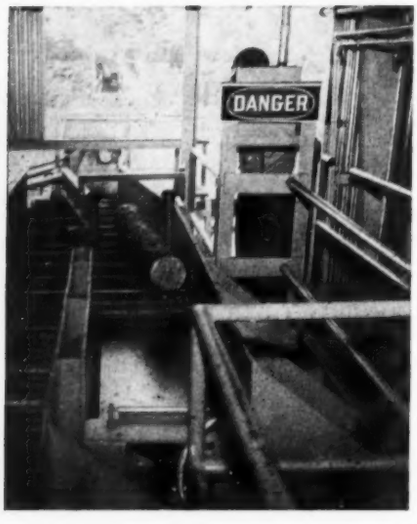
To promote this material, the company found a great need for adequate underlayment which would not telegraph and at the same time would be economical. The first popular core material was rotary cut plywood. This had many desirable features, but often telegraphing became too noticeable in the highly reflective surface material. There were also some problems with warping, dimensional stability, and screw holding properties. These problems occurred with both plywood and hardboard.

Some of these problems would not have turned up, it is admitted, if the Formica had not been mounted poorly, or assembled with sub-standard base materials by building contractors who were trying to cut corners as they cashed in on the Formica name. This material, like most face veneers, requires balanced construction. The company supplies a proper backing as a balancing sheet and recommends it for all horizontal applications. But is is not always used.



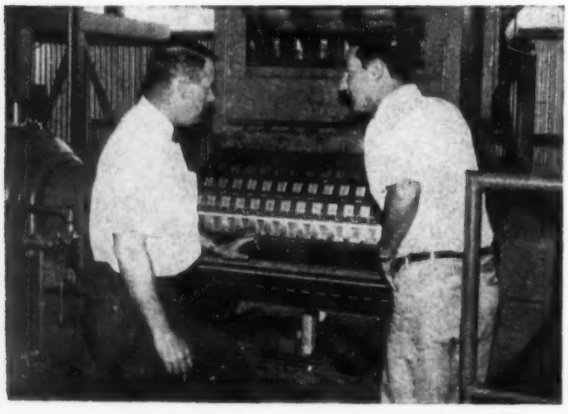
Adequate supplies of green timber amounting to 4,000 cords are kept under careful inventory control.

1 Two Pettibone Cary-Lifts make simple work of unloading trucks to stock pile and from stock pile to conveyor.



2 Logs feed into flaker house from belt conveyor to rollers, then drop into position for cut off saws.

3 Logs are cut to 36" bolts as they move up through saws on chain conveyors.



4 Exposed view of cutting blades shows unusual high-speed drum principle of Newman Machine Co. flakers.

Neither Formica nor the plywood people can do much about unscrupulous contractors and cabinetmakers. So, a basic need was felt and something had to be done about it.

Formica has been following developments in new processes for wood as core stock material since 1947. The company's research people decided that flakeboard, made under a precise quality control program, is, at least, a long step in answering the problems. As they will quickly point out, the finest installations require balanced backing for flakeboard. But, with or without backing, telegraphing and cost problems are solved.

► *WHAT IS FORMICA FLAKEBOARD?*

Flakeboard is made by combining wood flakes, synthetic resins, and other compounds such as waxes, to form a dense, 45 p.c.f. board under heat and pressure. In basic principle, the process is not greatly different from those used for several years in making boards of ground wood particles, sawdust, hogged particles, chips, splinters, and similar wood materials. The new board is made with several variations and provides certain properties more desirable to meet the company's specifications.

The newer process requires precision cut flakes. This cannot be done except with green timber with 40% or more moisture content. Dry waste by-products from furniture, plywood, planing mills, sawmills, and other primary wood users will fracture and splinter, but not flake.

By using flakes from green timber, flaking is more satisfactory and the plant can more easily control other properties of the board. Formica technicians declare that Flakeboard gives the highest strength-to-weight ratio of any type reconstituted or wood particle board now available. A board made of ground particles will have a modulus of rupture between 1200-1900 p.s.i. in a 40 p.c.f. density. A flakeboard of the same weight will have a minimum MOR of 3000 p.s.i. and the board being produced at Farmville is expected to have a minimum of 3500 p.s.i.

Screw holding power through the face and into the edge of flakeboard is equivalent to, or greater than plywood. Machining properties are said to be superior. Moisture absorption is equal to, or better than plywood. An additional feature of flakeboard is that the properties can be precisely controlled to meet specific applications, something not feasible with plywood and conventional particle boards.

► *IF FLAKEBOARD IS THE ANSWER, HOW DOES A COMPANY LIKE FORMICA GO ABOUT LOCATING AND SETTING UP WHAT IS TO BE THE WORLD'S LARGEST PLANT?*

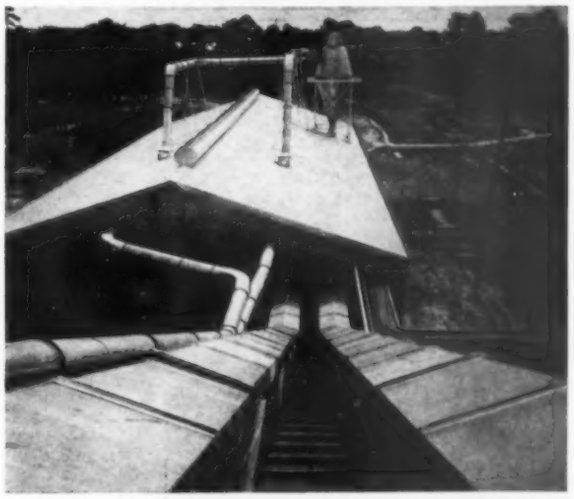
"The first step," reports E. G. Williams, vice-president in charge of manufacturing for this subsidiary to American Cyanamid, "was a thorough marketing research job to ascertain the exact nature of the product."

It was in 1956, just before Formica became a subsidiary to American Cyanamid, that management decided to consider construction of a plant to produce a high quality flake-type board. The merger was timely. The parent company possessed the financial resources and had experienced technicians for research into the physical and geographic needs of such a plant.

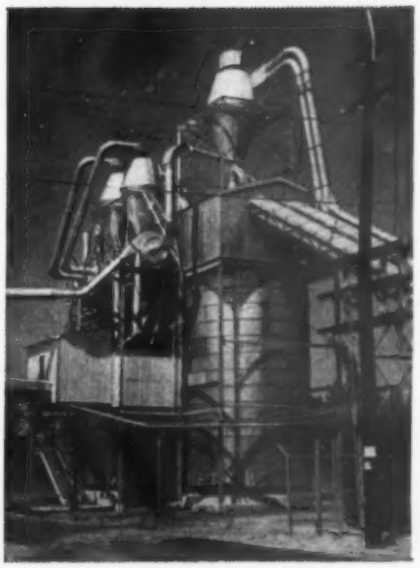
Requirements were basic, and rather obvious when reduced to their fundamental essence. The plant should be close to initial major markets to avoid high freight costs to the user. The location should be close to pine forests where good conservation was prac-

5 *In operation, protective hoods cover flaker blades and discharged material as flakes blow out onto the classifying screen bottomed vibrator conveyor.*

6 *Length of flakes is fixed by design of cutting blade, widths average ⅜", but the Formica process requires a close tolerance of 0.001" on thicknesses as checked here by micrometer.*

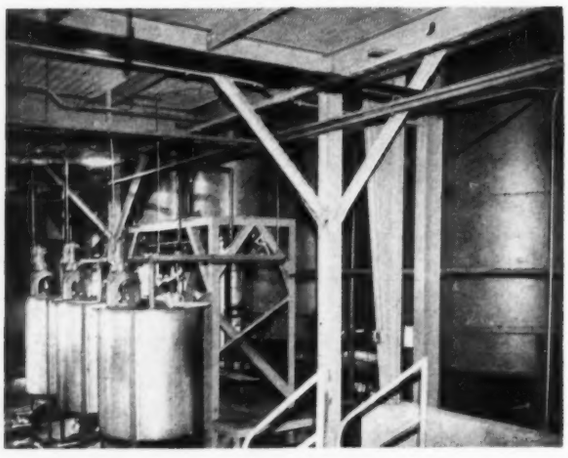


7 *Looking down catwalk along conveyors toward flaker house where flakes and fines are separated before they move up to three silos.*

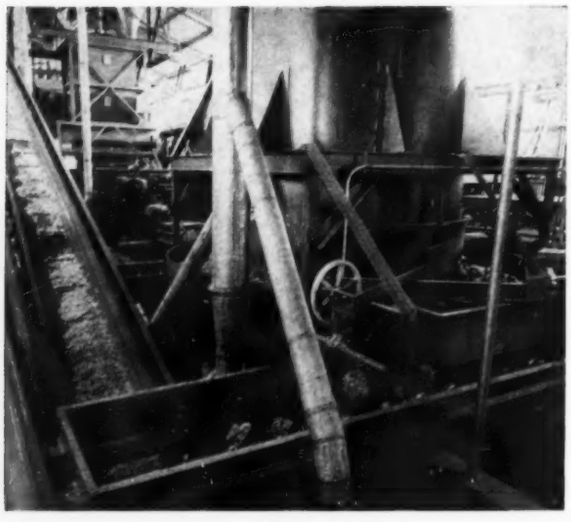


8 *Looking up toward silos where green flakes are held until ready for drying. Conveyors at upper right carry flakes and fines up from flaker house.*

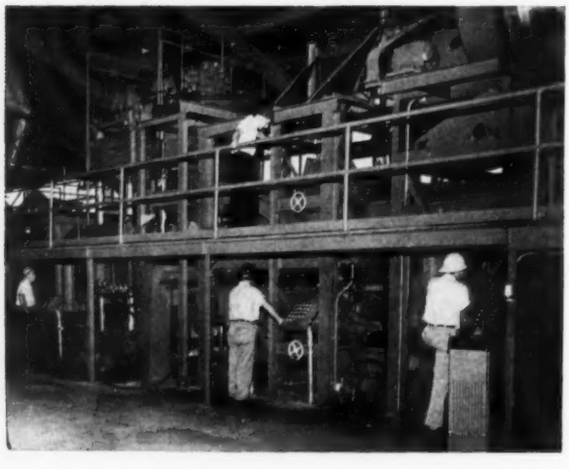
9 *Gigantic driers, 6' in diameter and 120' long, remove moisture from particles before they are blended adhesive.*



10 *Urea-formaldehyde resin is stored and mixed here, ready for blending with particles.*



11 *Flakes are blended with resin and automatically metered to screw conveyor, then belt conveyor to top of distributor in background.*



12 *Three stations control the Star Iron & Steel pre-press which squeezes mats down thin enough to enter press openings, trims the ends, and tamps the sides as they pass along toward the press.*

ticed and rate of growth exceeded rate of cutting.

It was also necessary to consider location, even in ideal forest areas, with its relation to the competitive buying influence of pulp mills. More emphasis was given the considerations for supply of the wood raw material than the resins. Resin supply was no problem because both Formica and American Cyanamid are resin manufacturers.

Another requirement, not related to location distance from markets, was tariff structure. To reduce costs further than the mere consideration for shipping distance, the plant needed to be in an area of good rail facilities and favorable freight rates.

Initial markets primarily centered around the east coast. This narrowed the search to north central, New England and southern states.

Freight rate schedules ruled out the north central and New England areas for servicing the entire east coast from Maine to Florida.

Climate and lack of geographic obstacles narrowed the problem and focused more attention to the south. There, growth rate of pine was found to be about twice as fast as in the north; and climate favored year-round supply for continuous production.

Further studies indicated North Carolina. The political climate was as good as the weather. The state wants industry enough to bend over backwards in cooperating. Labor supply was plentiful with intelligent, tobacco farmer families of eager workers. Rail service was good. And, the state not only is ideally situated in relation to the over-all market areas, it has an excellent record in good forestry

practices. The coastal plains of North Carolina were finally pinpointed with a good surplus of pine growth-to-cutting ratio, and conveniently located away from the heaviest competition with pulp mills.

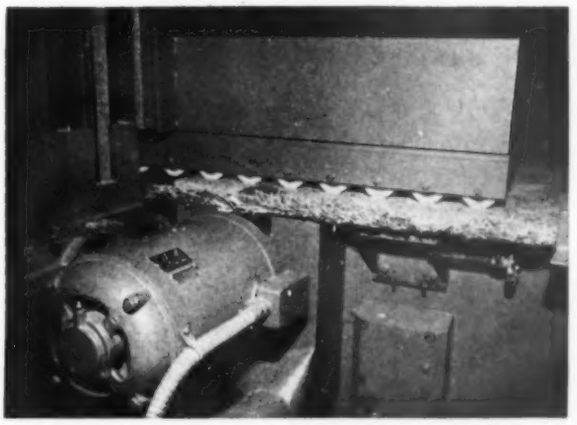
But, as the pin-pointing of location became sharper and the search became accelerated, the problem became more complicated before a particular county, then town, could be chosen.

It was at this point when specific labor rates and number of available workers had to be considered. A compromise had to be struck between local prevailing rates and those considered normal by the company, otherwise the local economy would become unduly disturbed. Actual bids had to be taken on timber to arrive at definite costs. Quality of raw material yield had to be considered. More specific details had to be defined on transportation problems. Available personnel had to be analyzed. Tax structure of counties and towns, as well as local insurance rates had to figure in the total analysis.

A state forester, an engineer, and an attorney worked hand in hand throughout this search for a plant site. Officials of the company talked with civic officials and politicians. They visited town after town: and sat in local diners over coffee with townspeople.

Many questions were asked. What were the hospital and medical facilities? How about churches? Schools? Recreational facilities? Were there adequate hotel and motel accommodations? Were they near enough to universities for possible assistance from them? North Carolina State College at Raleigh

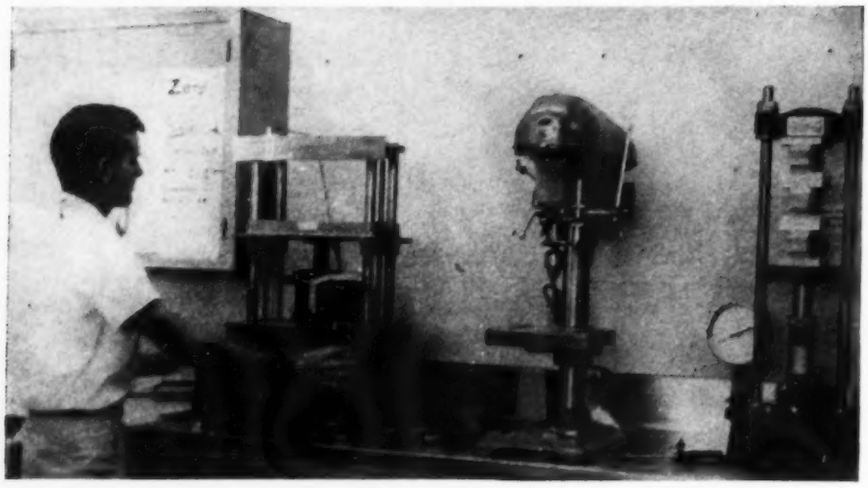
13 *Williams White & Co. 16 opening, hydraulically operated, steam heated presses, one for each of the two complete production lines, press mats into boards. These uniform opening and closing presses can produce boards up to 6' x 12'.*



14 *Cured boards are automatically conveyed through Mereen-Johnson trim saws equipped with Simonds 12" carbide tipped blades which trim to uniform 6' width.*

15 *Yates-American 8-drum sanders sand top and bottom surfaces of board simultaneously.*

16 *Steel cauls are automatically ejected from line and offset to return conveyor for recycling after boards are removed for cooling and equalizing.*



17 *Roomy laboratory provides adequate facilities and equipment for continuous testing of Flakeboard. Technician here is testing MOR on a National Forge stating bending press, using a 5/8" x 3" x 20" sample. The 14" Model B Delta Drill Press prepares holes for screw holding tests. The Carver Laboratory Press at right squeezes samples for Weldwood Presto-Set adhesive to cure before internal bond tests are made.*

18 *Plant-in-miniature set up consists of mixer at right, hydraulic prepress at center, and hot press at left. This equipment provides exact duplication of major functions of manufacturing in the plant for tests on resins, formulations, pressures and heat.*

is well known for its activities in wood technology.

Mr. Williams said that options were taken on three or four pieces of property near Farmville when comprehensive studies were being made. Each had to be individually studied in terms of practical conditions such as character of neighborhoods, construction and soil factors, drainage, fire protection, available storage facilities during construction.

Once Farmville was selected and construction begun, comprehensive public relations programs had to begin immediately. It was important to establish good local relations and to offset disappointments of other communities which had been under consideration but rejected in favor of Farmville.

"We were quite attracted by the community atmosphere in Farmville, and greatly impressed by the quality of the people and their willingness to help," Mr. Williams explained. "We recognize that the southern markets for construction and industrial materials are growing, and that a North Carolina location is a good one in terms of reaching these markets which have not yet reached their peak."

NOW THAT IT IS BUILT, HOW DOES THE PLANT OPERATE?

The green timber is delivered by truck and rail to a 90,000 sq. ft. concrete pad, with capacity for 4,000 cords, under careful inventory control. Logs are conveyed to the flaker house where 46" 70-tooth steel saws cut the material into short bolts. Newman Machine Company flakers, with capacity of 171 cords or 5300 lbs. per 24 hours, cut flakes approximately .015" thick by 1¼" long. Thickness is controlled within plus-or-minus .002". Length is fixed by the blade design of the flaker drum. Widths vary with an average of ⅜".

Flakes are vibrator conveyed over classifying screens which grade the material coming from the four flakers. All are consolidated in one conveyor from the flaker house to two flake silos 20' in diameter by 40' high. A third silo of 10' diameter receives the fines.

As required for production, particles move from silos to three Hardinge driers where 100% wet flakes are dried to 4% moisture at the rate of 500 lbs. per minute. The driers are 6' in diameter and range from 90' to 120' long. Each is built up with Ruggles-Cole retorts, Meco-Acme air heaters and Johnson burners.

Dry flakes go into surge bins from which they are metered through a resin spray to blend controlled amounts of urea formaldehyde. They are laid on steel cauls by a patented system which assures horizontal orientation with grain in random directions. This formulation of the mat is said to be the key to good dimensional stability and other properties of the final board.

Mats automatically pass through a pre-pass to squeeze them down to more compact thickness for loading into the curing press. Two Williams-White 16-opening, steam heated hydraulically operated curing presses, one for each of the two parallel production lines, complete the mechanical steps of manufacturing boards.

A specially designed cooling chamber receives boards from the presses and rotates them on individual, radial indexing racks for thorough cooling by forced air. Boards automatically feed off a conveyor near the top and, after one rotation in the cooler, slide out to an offbearing conveyor immediately below.

Boards move next through trim saws manufactured by Mereen-Johnson with 24" 70-tooth steel blades, then through Yates-American 8-drum sanders, and finally are cut to size on Mereen-Johnson saws with 12" carbide tipped blades. Sander abrasives currently used are Behr-Manning, particularly the garnet resinall fiber in 100, 80, 60, 40 and 36 grits; Durite resinall fiber with 20 grit; and, Durite closekote resinall fiber with 24 grit.

Completed boards are stored in a 100' x 350' warehouse which has capacity for about one month's production.

The drier house is 160' x 60', production building 100' x 420', all buildings by Armco Steel, to house the Industrial Development Corporation System. The plant was engineered by the Engineering & Construction Division of American Cyanamid under Project Engineer C. J. Robinson. Construction was done by Rea Construction Company of Charlotte.

The plant property covers 97.63 acres of which 35 acres are utilized at present. Production capacity is 40,000,000 board feet a year.

In such a huge plant, the safety program is of great importance. Major hazards include high noise level and log jams in the flaker operations. Potential fire hazards are in the drying operations, fine dust and particles in production, particularly in sawing areas.

Numerous counter measures were taken to establish ultimate safety under operating conditions. Machine guards are provided wherever possible. Dust collectors are installed throughout. Protective goggles, helmets, and gloves are worn by operators. All men exposed to extreme noise are given hearing tests and provided with ear plugs. The plant is fully equipped with sprinkler systems, an adequate 8" water supply line, fire hydrants, and fire extinguishers.

***19** Technicians checking thickness and density of samples before MOR test. Eleven different tests are performed in this area. Soak test tank is shown in background. Frigidaire refrigerator in background supplies ice cubes for controlling water temperature.*

The plant safety committee is made up of the plant manager, safety manager, and all department heads. They will review all accident statistics and supervise corrective action where necessary.

► *WITH SUCH HUGE FACILITIES AND PRODUCTION OUTPUT, WHAT UTILIZATION IS ANTICIPATED FOR THE NEW FORMICA FLAKEBOARD?*

The expected major uses are; underlayment for Formica, furniture cores, cabinet doors, flush door faces, sandwich panel applications, sub-flooring for residences, sheathing, and decorative wallboard. The company is not presently concerned with FHA regulations on the use of particle board.

► *WHAT ABOUT DISTRIBUTION?*

Formica flakeboard is expected to reach national distribution in due course. However, in spite of the capacity of the new plant, it can handle only the east coast markets. It is not expected, nor is it considered practical, to ship material from this plant beyond the Mississippi.

The greatest percentage of output will go through existing independent Formica distributors. The company does not utilize "captive" outlets, but distributes on a merit basis through completely independent channels. It is only natural that expanded distribution will be sought, but distributors will be supplied one by one only as production assures a constant supply of quality board.

► *WHAT CAN BE SAID ABOUT QUALITY STANDARDS?*

Sales Manager W. F. Drees said, "Actually, there are no accepted standards, as such, in the particle board industry. We have been using the test methods (American Society for Testing Materials) which we feel give the most reliable data.

"We are, of course, interested in helping to establish industry standards, and have been discussing the possibilities with other manufacturers in the industry.

"As I see it, to become established in the particle board industry, particularly if quality of product is to be considered at all, there are three major factors to consider. First is capital. Everything else flows from this, because you need more than just a plant. You must be willing to lose money for a while at the start. Second is a strong research organization to work toward quality. I feel strongly that in the long run, quality of product may determine who succeeds and who fails in the particle board business. The third factor is the market organization and distribution facilities. This, again, related to having something more than just a plant.

"An interesting point beyond these factors is why we have a dual line. Many people have designed their plants with one press line to do only one job. It seems to me that this lacks flexibility. We deliberately set ourselves up with two full production lines with sufficient equipment to make a wide range of product and board sizes. This gives us not only the huge capacity of the world's largest plant, but more important, flexibility."

RESEARCH . . . .

By
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Executive Secretary
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- *Seven out of ten woodworking plants don't spend a thin dime on research! Why?*
- *Can a typical company prove that the more you invest in research, the more new products you will uncover for sales, and the more profits you can anticipate?*
- *We need both fundamental and applied research. Fundamental research builds a stockpile for future development of applied research.*
- *What are the outstanding developments of the last 50 years? Do they justify the expense of further research?*
- *Where will future research take us? What is important to your company? How can research develop new products?*

Where it Has Been

Research is probably the most overlooked and at the same time misunderstood term in our business vocabulary. The late Thomas Doane Perry described it as, "Something to which woodworkers in general have been particularly allergic," Mr. Perry was not alone in this contention. Mr. S. W. Antoville, chairman of the board of U.S. Plywood Company, put it this way, "Our wood products industry has many things of which it can be proud, but our devotion to far-seeing research has not been one of our distinctions in the past . . . except for a few notable exceptions."

The fact remains, and statistics bear it out, woodworkers, including furniture manufacturers, are at the bottom of the heap when it comes to supporting research. Several years ago a Harvard Business School study showed that only 30% of lumber, wood products and furniture companies of all sizes support research, compared with an average of 50% for all U.S. plants, and 80% for the chemical industries. Simply interpreted that means that 7 out of 10 plants in our business don't spend a thin dime for research! Why?

The same survey revealed that furniture and woodworking industries invest but 1/20th of 1% of their net sales in research compared with an average of 1.33% by all companies. Some companies, competing directly against wood products spend as much as 5% of their net sales for research. Is this differential becoming apparent in such trends, as for example, the tremendous promotional swing to aluminum siding for homes just getting underway.

The serious woodworking executive should ask himself, "Is there a direct correlation between the dollar investment in research on the one hand, and adequate business profits on the other?" We think there is. Among the giants of industry, one often hears the comment that one-half to three-fourths of the products they are now making were unknown or in the research stage 10 or 15 years ago.

For a medium size woodworking company, Nickey Brothers, Memphis, Tennessee, is a case in point. Not too many years ago its principal products were lumber, flooring and hardwood plywood. Then they stepped up research in their management thinking; and one by one developed such advanced products as electronically-edge-and-end-glued core stock,

and Where It is Going

"Presto" logs from residues, resin-impregnated mahogany laminates, impreg for die stock, and more recently, several lines of prefinished decorative wall paneling. Still under research are a unique new type of flooring and a vast background of long-range study on potential chemical and plastic uses for wood residue. Small wonder that this company is being looked upon increasingly as a model of wood industry research. It is well to remember, too, that novel, modern products are always more profitable than the old. By implication, the more you invest in research, the more new products you will uncover for sales, and the greater will be your profits.

If all this is true, and few would argue otherwise, then why don't more woodworking companies engage in and support practical research? The first, and obvious answer is that they still don't understand it, its implications and benefits. Let's not kid ourselves; research is a practical, money-making venture requiring considerable technical knowledge. Few of us would risk our funds in a venture, the ramifications of which we do not fully comprehend. Remember, too, that research has become of age only since World War II. Some small idea of how it has grown is illustrated by the fact that research has progressed successively from 10,000 persons and a budget of $29 million in 1920, to 70,000 and a budget of 234 million in 1940. Today 400,000 persons are engaged in research projects valued at over 8 billion dollars today.

Research means many things to many people. To the scientist it is the pursuit of pure or fundamental knowledge. To a woodworking plant it may mean the search for uses and markets for its residues, or the redesign of its product to regain lost markets. In whatever light it is viewed, research is fast becoming a competitive necessity, a cost of doing business just like production or sales, and it should be so provided for in the operating budget.

There are two principal kinds of research,—fundamental and applied. The former is the primary province of our public agencies and educational institutions, while the latter is the responsibility of private industry. Naturally, there is some overlap in each instance. About 90% of all research performed in the U.S., according to Dr. J. T. Rettaliata, president of the Illinois Institute of Technology, is

This picture symbolizes the sharp contrast between old manual woodworking methods and today's push-buttons and control panels. These developments are a result of research to bring about new products and new ways of producing them.

of the applied type. In the future it will be imperative that greater emphasis be placed upon fundamental research. While the benefits of applied research are immediate and far-reaching to the nation, at the same time over-emphasis on applied research can have the effect of jeopardizing our potential for further achievement by depleting our stockpile of existing knowledge. In a word, we have been living off the fat of prior discovery, and must now replenish our larders. For this reason, if for no other, all of us—woodworkers, lumbermen and researchers alike—must continue to wholeheartedly support research, fundamental as well as applied.

Assuming that yours is a small company and that you decide to invest a percentage of your earnings in research on certain projects you have in mind. What's the best way to go about it? First, look up a competent research counselor and discuss your ideas with him. Excellent advice is available from such diverse organizations as the U.S. Forest Products Laboratory at Madison, Wisconsin, the lumber industry-sponsored Timber Engineering Company research laboratory at Washington, D.C., your nearby university forest products staff, the trade association to which you belong, or any number of excellent private research consulting companies. If your ideas are sound, and you decide to go ahead, you will need to assign one or more technically-trained men to your project. While qualified wood technologists today are somewhat in short supply, nevertheless by checking with your nearby universities, you may be able to get leads on some very valuable wood technologists.

Whether or not the seven out of ten woodworking plants today who do no research of their own

decide to get into a project, one fact should be certain from this discussion. They can and should support fundamental research by whatever public agency it is conducted. For only by continually enlarging upon the background of basic knowledge we have of wood, can the practical, profitable new products of the future be developed. We can all support research by talking it up through our elected officials both at state and national levels.

- ***What are the milestones of the last half century? Will the next 10 years be as productive?***

Before we take a look ahead at what an expanding research base could mean to our woodworking economy of the future, perhaps it would be well to also take a look back, and review some of the milestones of progress in the past half century since 1900. At the rate we are going, the next 10 years will probably see more development in the entire wood industry than the past 50!

1900—Expanded use of animal and vegetable glued hardwood plywood in furniture.

1903—First annual meeting of the National Lumber Manufacturers Association. Principal order of business was a study of lumber grading rules. Over the subsequent years NLMA, composed of the principal regional lumber associations has been helpful in bringing about a closer degree of uniformity between grading rules and inspection procedures of the different regions. . . The dollar savings resulting from standardization over these years have been almost incalculable.

1904—Formation of the American Wood Preservers Association. Although never a large organization numerically, it has accomplished more than any other single influence to hasten progress in the wood preserving industry and to develop standards for the materials and methods used. Some 300 pressure treating plants in the U.S. now treat more than 300 million cu. ft. of wood annually.

1905—Douglas fir plywood panels exhibited at the Lewis & Clark Centennial Exposition in Portland. Using animal glues, they were the start of the softwood structural plywood industry which, as first protein and then resin adhesives came into the picture, burgeoned from a consumption of 150 million sq. ft. in 1925 to over 2700 million feet annually.

1906—Development of vegetable glues from cassava or tapioca flour by Frank G. Perkins, provided the first low-cost glue for woodwork.

1907—The American Society for Testing Materials published its first standard specifications for structural timber. Today, after 1,000,000 laboratory and full-scale tests, it it is possible to design timber structures with the same efficiency and assurance of safety possible with any other structural materials.

1910—Establishment of the famed U.S. Forest Products Laboratory at Madison, Wisconsin—a public research facility that was eventually to make itself felt in every sawmill, woodworking plant, furniture factory, paper mill, veneer and plywood operation in the nation. It can be said without fear of contradiction that there is scarcely a commercial wood product made today that somewhere in its development was not affected by fundamental research emanating from this Laboratory.

1912—Henry Haskel demonstrated the use of blood albumin as a waterproof glue for canoes, the most water-resistant glue bond available then.

1916—The first casein glues derived from curds of milk were made commercially available by Wm. F. Leicester. Its use did not require hot-pressing, yet produced bonds of high water resistance—the standard until later development of waterproof synthetic resin adhesives.

1922—Herbert Hoover, then secretary of Commerce, called the First General Lumber Conference. His keynote was that the lumber industry should begin to develop conservation of timber resources. This was about the time of the transition in lumber production from old-to-second growth which began in the south; and the sustained-yield concept of tree farming was first recognized.

1924—Brilliant wood research expert, William H. Mason, discovered in a planned explosion carried out in a small steam gun, the first step in making hardboard. His theory was that wood chips could be exploded into their component fibres. Mason and his sponsors organized to form what was known in 1929 as the Masonite Corporation.

1927—Introduction by Irving F. Laucks of water-resistant soybean plywood glue.

1929—Start of solid core flush door industry by William H. Roddis, followed in 1938 by various semi-hollow core designs, enabling substantial reduction in weight and cost of doors.

1930—Introduction of metal connectors by the Timber Engineering Company, affiliate of NLMA, widened the horizon of wood construction. Their use in trusses and other heavy timber construction enabled the design of large structures up to this time beyond the capabilities of conventional timber design. In the decade following more than 100,000 structures were built employing modern connectors.

1934—One of the first glued laminated wood arch buildings in the U. S., 46′ span, erected at the U. S. Forests Products Laboratory.

1935—Birth of the prefabricated housing industry at the U. S. Forest Products Laboratory, Madison. Still in service after 20 years, these plywood

stressed skin designed prototypes of several hundreds of thousands of homes erected since, answer the question: "How does the prefab house stand up in service?"

The most important single developments in the plywood industry during the 1930's were synthetic resin adhesives and hot-pressing, resulting in waterproof plywood. A succession of adhesives, starting with the introduction of Tego film by Rohm & Haas, followed by the ureas, melamines and the resorcinols, ranging from high water resistance to complete waterproofness.

1943—The introduction, from the metalworking industries, of high frequency electronic heating equipment for rapid curing of synthetic resin adhesives in furniture manufacture, assemblies, edge and end-gluing operations.

1944—Prototype of the first U.S. particle board plant went into production in Switzerland, followed by the U.S. Plywood Novoply operation in the U. S.—a basic wood utilization development that for years to come will not require additional timber resources but will use current residues.

1946—The introduction of the first revolutionary change in the sawmilling industry since the advent of the band saw in the 1800's—hydraulic and mechanical log barking and chipping, opening a tremendous new field in residue utilization and integrated lumber-papermill operations.

1947—The founding, by 14 men representing industry, education and government research of Forest Products Research Society in Madison, Wisconsin, which today numbers more than 3700 members throughout the U. S., Canada and the free world. Its meetings, both local and national, bring the benefits of wood technology to the industry; provide a forum for practical discussion of industry technical problems.

1947-58—Someone has said that there has been more research conducted since World War II than in all previous recorded history. By the same token the wood industry has taken giant strides toward industrial maturity and research self-sufficiency in the past decade. There have been so many contemporary technical advances made that to attempt to select the most noteworthy should be left to the future. Who among us today can portend with certainty the marvelous implications of lignin research five or 10 years hence, or the manner in which helicopter logging may alter our preset course; yet real, practical progress on new chemical and plastic materials from lignin has already been achieved in the laboratory, and gigantic "flying cranes," are on our drawing boards.

Significant research in recent years has included a commercial process for laminating 2x4s out of lower-grade 1x4s; scraf-jointing plywood panels to limitless length; successful electronic drying of softwoods in a matter of hours rather than days. Cemented carbide tools, offering tool life 20 to 25 times that of conventional tool steel, are readily available.

Six developments in the past six years alone are worthy of specific note. In 1954 paper-overlaid lumber emerged from the development stage to become widely adopted in up-grading special typs of plywood and low-grade lumber. In 1955, impreg, a resin-impregnated mahogany laminate, the closest wood product yet to total dimensional stabilization revolutionized the automobile model and die business. In 1956 we saw developed the first prototype wood-slicing machine designed to eliminate sawdust losses. In 1957 various new processes for prefinishing paneling and wood products moved the wood industry one step closer to mass-production and automation, and in 1958 comes news of the first fire-resistant wood to be classified as "basically non-combustible in certain fire insurance rating schedules." Known as "Non-Com" pressure-treated wood, it is a product of Koppers Co.

- ***Future research will be regional. It will include investigation of methods not now feasible. There is no limit to research.***

So much for the past, but what of the future? Are there any signs we can recognize today that presage probable developments 5 or 10 years from now? Almost axiomatic are such trends as more widespread plant integration to take advantage of the full potential of the log, such as the 70%-plus utilization realized by such companies as U.S. Plywood and Weyerhaeuser.

Another trend is that toward research decentralization. The U.S. Forest Products Laboratory, for example, is placing more emphasis on *regional* wood utilization problems as contrasted with purely national research. More states and universities (California, New York, N.C. State College, Yale, and others) are establishing full-fledged research laboratories staffed and equipped to cope with local and regional wood technology problems requiring either fundamental or applied solutions. All of this will mean an accelerating rate of research, with the life-span of new products from the research stage to production, materially shortened.

More specific developments that hold great promise for the future include: solar wood drying, developed by the U.S. Forest Products Laboratory and utilizing the sun's rays for rapid seasoning. Dimensional stabilization work continues to progress both in Federal and private industry labs. Prefinishing of all wood products is a marked trend; as is further development of particle board to incorporate such qualities as dimensional stability, strength the equivalent of lumber, manufactured-in color, finish, and deterioration-resistant treatment. Slicing of lumber to eliminate sawdust holds considerable promise; or this may be achieved by means of ultrasonic vibration techniques such as the Russians say they have perfected.

Both literally and figuratively there is no limit to where research may take us in the forseeable decade if we will but accept the challenge to think, plan and act!

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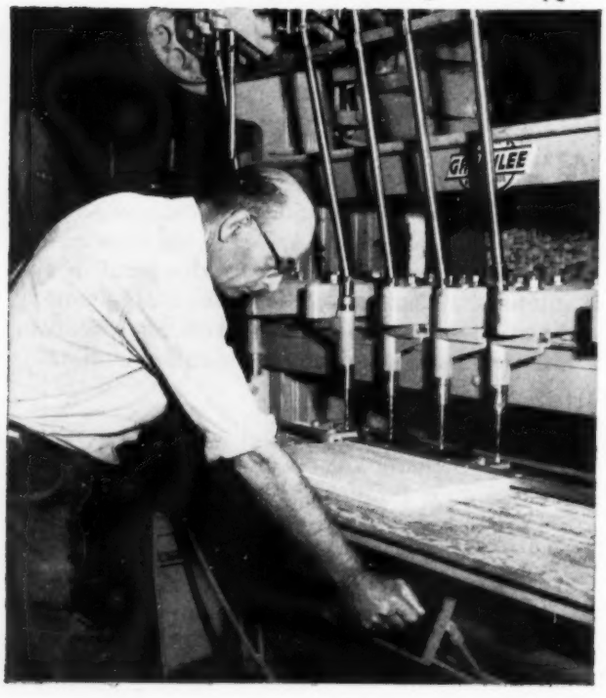

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A few of the retail furniture store representatives who attend the one week course on repair and refinishing which is sponsored by the Furniture Manufacturers Association of Grand Rapids.

THE SPIRIT OF GRAND RAPIDS

Is cooperation among manufacturers of wood products practical? Can we harm ourselves by exchanging information on methods and materials? Hitchcock's WOOD WORKING sent Field Editor Darrell Ward to observe the "Spirit of Grand Rapids" in everyday situations. Here is his report after seeing inter-plant cooperation at work. This interview expresses opinions of some of the men who have participated in this cooperative program.

It was during World War II days when an army expediter from an aircraft plant made an observation that sums up the spirit of Grand Rapids in terse military language. As this officer moved about from one plant to another on business of the moment, he turned to Chuck Kindel who was accompanying him, and said, "This is the darnedest thing I have ever seen!"

"What's that?" Chuck asked.

"People from various furniture plants not only walk through their competitors plants, they actually work in them!"

Mr. C. M. Kindel, vice-president-secretary of Kindel Furniture Company, better known as "Chuck" to friends and competitors alike, recalls that the Grand Rapids atmosphere was an entirely different thing before the War. Then, most people seemed to bottle themselves up in a shroud of secrecy about what was going on in their plants. But, a new spirit was the outgrowth of necessity when the Nation was facing an emergency.

War Dispels Shroud of Secrecy

During the War, many different kinds of woodworking plants made valuable contributions to the effort, either as prime contractors or as vendors of parts. Furniture for the home was of least concern.

As in other furniture manufacturing centers, Grand Rapids factories are sizable plants, but the huge facilities needed for mass production in national defense were something else.

A basic need had to be fulfilled. So, 15 major plants shouldered the responsibility by consolidating under the name of Grand Rapids, Industries. Every plant pledged its entire facilities, labor force and management to the single purpose of providing capacity for numerous vital war contracts.

One contract for 4000 complete sets of wings for the 15-man gliders used to land troops on enemy territory. Another was for all the wood parts going into 4500 liaison planes. Many other less dramatic projects of great importance to the defense program

were included in the cooperative production at Grand Rapids.

Chuck Kindel was works manager for the consolidated group and had full privilege of switching men and machines around from one plant to another as necessary to expedite the work. This was the extraordinary situation which prompted the army officer's observation. It was what provided the answer to an emergency crash program on balsa wood propellers.

In the midst of other problems occuring in the War effort, the army had a problem in cooling the B-29's of early design. Thousands of small and very light wood propellers were needed in a hurry for moving the air properly. Such propellers are precision balanced parts and cannot be slapped together carelessly or hand shaped very rapidly.

In answer to this call, every carving machine in Grand Rapids was rounded up to make an emergency production line for the balsa wood propellers until revisions were completed on the new B-29 design.

How Can "Emergency" Methods Be Adapted?

In spite of such accomplishments under "crash program" conditions, Chuck recalls an occasion only a few years ago when he had to "sell" the idea of a conveyor line to his spray finishing department. He had to hold conferences with the workers and develop a set of statistics to prove that the sprayer was literally lifting tons of merchandise and producing relatively little in actual results. Chuck wanted "to pay for skill, not backbone." Once the people were convinced and conveyors were installed, volume soared and net earnings increased tremendously.

The problem here was that good furniture traditionally was a hand crafted piece of art. The fine cabinetmaker always received a complete set of parts for a single unit and brought it to life with the personal satisfaction of individual craftsmanship. Even the finisher felt he must handle goods the hard way in order to develop the quality of finish he was getting.

Things are different now. Methods have changed and quality has been improved. Jobs are broken down into segments. Functions are performed on interchangeable parts. This, of course, requires more accurate machining of the parts for assembly and more uniform coating of finish materials on completed pieces which may go together as a full set. A worker who puts parts together or applies one of the finish coatings may never see the completed piece of merchandise when it is shipped.

These radical changes in the industry, Chuck Kindel said, are typical of what has happened since the War. Grand Rapids people learned much about production line techniques in defense work. When they were making the airplane wings, final assembly and complete finishing was done entirely on an overhead monorail conveyor. The wing never dropped from the line until it was ready for the shipping crate.

However, some of the recent changes in the industry which are directly traceable to War programs were somewhat slow in being adapted to furniture. And, while many tricks of the trade did come out of the War, handling defense work certainly did not result in learning all the answers to modern problems. It was the other way around. As in other industries, woodworkers found new problems introduced in government specifications. Contracts specified "smooth sanded surface." Chuck asked army engineers just exactly what was a smooth sanded surface. The answer to that one hasn't come yet.

How Furniture Association Helps Members

The Grand Rapids Furniture Manufacturers Association has tried to supply the answers to many problems. This active organization was founded in 1911 and has always promoted cooperation throughout industry in that area. Currently, the association holds meetings for directors every week. Specific theme for the organization is: "What service can be of benefit to the whole group?"

The association sponsors annual series of furniture technology courses directed by the University of Michigan Extension Service. Such courses for the current year include: Furniture Veneers, European Developments, Woods for Furniture Cores, Lumber Yield, Carbide Tools, West Coast Developments, and Industrial Engineering in Furniture Manufacture.

An annual series of clinics have been sponsored since the early 1940's on such subjects as: sanding, spray finishing, controlled testing of finishing materials, knife grinding, dry kiln operation, various machine operations, blue print reading and related engineering work.

Participation in the program extends outside of Grand Rapids and beyond the limits of actual furniture production. Furniture technology membership embraces all of the principal furniture plants from Grand Rapids to Holland, Michigan, and then extends to such organizations as the Abitibi Corporation, makers of hardboard and paper products; AMI Incorporated, manufacturers of commercial phonographs; Freedman Art Craft Engineering, commercial cabinetmakers; and the Story & Clark Piano Company.

There is an extraordinary feeling of mutual respect among all of these manufacturers. The spirit of working together to the mutual benefit of all is one thing which sets Grand Rapids woodworkers apart as an example for others in the industry. Once each year a special course is held for furniture dealers on repairing, patching and refinishing. This one runs for a full week with people attending from over 30 states. It is interesting to consider that this public service activity greatly benefits even the Grand Rapids competitors who sell through the same dealers.

There is a very free communication at the local level with liberal exchange of technical facilities and know-how between competitors. Many examples in everyday activity can be found in all the big name plants.

Are Plant Tours Necessary?

For instance, Chuck Kindel was reviewing a plant suggestion made one day by a worker. The worker and foreman were in the office together to explain the details. Chuck mentioned a similar idea being used in another plant. The foreman was humiliated by his ignorance of the fact and replied, "How am I to know about such things. I've worked here all my life and never saw the inside of another plant."

This revealing incident jerked Chuck's alert mind into action. How much ignorance really does exist in the minds of people who do not have the opportunity of getting around to other plants? He called A. H. "Sandy" Stuart, executive vice-president of John Widdicomb Company, and expressed his thoughts.

"Why don't we get together and have our foremen exchange plant tours so they won't feel so uninformed?"

"Good idea," Sandy said.

This may not have set a real precedent in industry, but it illustrates the obviously human side of the Grand Rapids spirit.

Sandy Stuart has taken the spirit of Grand Rapids for granted so long he was a bit surprised to learn that ready exchange of ideas, facilities and technical know-how is not so common in other areas. Yet he was aware of a need to expand what already exists in Grand Rapids.

Chuck Kindel had said that competition didn't mean anything beyond the merchandising and sales level. Sandy Stuart went a bit further. He said that at the shop level and among engineers, cooperation was excellent. But, there is a great need to penetrate what appears to be a hard core at the top management level. Many high executives will indicate they are just too busy to bother. This is true, he said, with exceptions of plants which are headed up by people like himself and Chuck Kindel who are primarily concerned with manufacturing instead of selling. Sales-minded executives often overlook the benefits of mutual cooperation which may result in improved quality or more economical production.

Sandy said there have been many times when he has farmed out a piece of specialized work, and even borrowed materials in emergencies because of his close relation to a competitor.

He, himself, has done considerable kiln drying for others when they were short on kiln time. This has been done for only nominal fees or, when the job was not really large, practically for no fee at all. This attitude was uncovered in other plants.

How Is a Tour Arranged?

Any time one of the Grand Rapids group installs a new piece of equipment, he is likely to invite others over to take a look. This kind of thing is taken for granted among top names like Stow & Davis, Grand Rapids Chair, Baker, John Widdicomb, American Seating, Hekman, Herman Miller, Imperial, Johnson, Kindel and others of the same caliber. Even people from Story & Clark Piano Company over in Grand Haven participate when their interests overlap those of the furniture manufacturers.

This spirit of Grand Rapids, however, does not mean that the friendly competitors are all a bunch of good little boys who sit around holding hands and patting one another on the back. No one actually throws all his doors wide open for just anyone to come in and observe *everything* he is doing. To the contrary, the usual custom is to call someone and ask to see a particular operation. An invitation is extended and a visit made. Naturally, there will be some minor resistance between a few individuals.

Bob Lillie, secretary at Johnson Furniture, in charge of personnel, employee relations and most of the purchasing, said he came into the industry from law about 13 years ago. For that reason, he is not a true production man in the usual sense and is not as close to some plant operations as other people interviewed. Yet, he is well aware of the spirit of Grand Rapids and could cite a few examples.

When he was recently interested in hardboard utilization for case backs and chair bottoms, he called Ted Kindel who was supposed to be getting satisfactory results from the product. Ted not only provided all the information desired, but also offered a generous sample quantity for experimental use so that Bob could avoid having to purchase a large quantity lot before making a decision.

After working with the material for a while, Bob found that smooth surfaced hardboard presented problems in successful bonding of veneers. He checked with Stow & Davis and Bill Anderson invited Bob over to see how it was done.

Bob learned that his problem could be licked by adding furfurol alcohol to the glue to get better penetration. He didn't have any for his tests, so Bill offered him enough for experimental use.

Bob said that in his opinion competition is healthy if it is approached in the right attitude. It leads to improved methods of production. You are challenged to make the best quality product you can for the right price. Competition is a preventive medicine against dullness in business and may often serve as curative surgery in rooting out obsolscence and complacency throughout an organization.

The Spirit of Grand Rapids at Work

American Seating is a giant in the industry. This corporation has more than 5000 stockholders and employs over 2000 people. It dates back to 1886, when an original scattered group of small plants began growing to the present size of 1,700,000 square feet of floor space in 38 buildings, covering more than 20 acres of ground. More than 5000 different school supply items are sold by this company. During the War, they turned out more than 5,000,000 folding chairs for the armed forces. Nearly 400,000 square feet of veneer are used monthly for church

furniture alone. They have supplied all of the 16 major league baseball parks with seating equipment.

For a company of this size and scope, one would take it for granted that they would have no time for the smaller neighboring plants of the industry, competitors or not. Nothing could be further from the truth. American Seating is an integral part of the Grand Rapids industrial atmosphere and has made significant contributions to every program of mutual benefit to the whole area. They often have helped out on specific problems which turned up even in the smaller plants.

Bill Henrikson, manager of the research and development department is an engineer who commands due respect from associates and acquaintances, but he would never be able to cover up the warm human response we observed at our interview which kept him in his office much too long after working hours. Bill not only helped to recall incidents out of the past to illustrate our story, but he called in a number of other people whose intimate knowledge and personal contact with the events helped pin down the objects of our search.

American Seating operates very extensive laboratories and testing equipment for testing adhesives, moisture, durability of assemblies, screw-holding properties, finish characteristics such as abrasion resistance, hot water resistance, film thickness, gloss, hardness, preservative treatments and alkali resistance, as well as the qualities of all types of joints and wear parts such as drawers and runners. With such an array of facilities, it is natural that other manufacturers would be inclined to call on American Seating for many things they could not handle for themselves.

The American Seating testing labs have been made available to many people from time to time and comprehensive tests have been made for some of the furniture manufacturers. One was durability tests on a new chair frame design which was questioned because of its slim looking lines.

Even a company the size of American Seating occasionally needs help from smaller people and are very happy to have mutual relations such as we found all over Grand Rapids. Ply-Curves has done production work for American Seating on curved plywood when the big plant was loaded to capacity on seasonal goods.

Sandy Stuart handled some veneer splicing at the John Widdicomb plant when some defective parts were found coming off a splicer at American Seating. In order to prove whether the problem arose from the glue, the methods, or the machine, American Seating engineers felt they should use a similar machine in another plant under simulated conditions. Tests were made at John Widdicomb and the questions answered. Everyone involved in the tests learned a little something they had not known before.

What Have Association Meetings Accomplished?

The informal and prolific exchange of ideas and technical know-how at the association meetings is a valuable activity which brings people closer together even when they are not in competitive or related types of plants. American Seating is always ready to cooperate, especially with the furniture technology courses put on by the University of Michigan. Groups from these courses, as well as from classes at the college, make regular tours of American Seating and other plants of the area.

When airless spraying was being introduced to the industry, equipment suppliers held demonstrations for all the trade at American Seating.

Joseph Snyder, plant superintendent at Story & Clark Piano Co., Grand Haven, said, "Suppliers will offer plenty of general information, but I find that nothing can compare with plant experience. That is why I take every opportunity to pay an informal visit to any plant that will let me in. We've always had a policy of inviting other people into our plant."

Once when electronic gluing was under consideration at Story & Clark, Joe visited wood working plants in Muskegon, Grand Rapids, Goshen, Indiana, and down south to gain knowledge from those with first hand experience in the technique. When he was first going into a teak veneering number, there were problems caused by the oiliness of the wood. He learned that Baker Furniture Company in Holland was using teak, so off he went to learn what he could. At Baker, he found that washing the teak with solvent would remove the natural oils. And, while he was at it, he also determined what kind of abrasives to use for sanding and what kind of materials produced the natural oil finish he wanted.

Joe likes to attend all of the Grand Rapids Furniture Manufacturers Association activities where "Everyone is very open and frank about their personal experiences in discussion over current problems."

He feels that clinics are very constructive because of the authoritative speakers, the question and answer periods, the free discussions that follow, and the specific plant tours where the subject matter covered at the clinic is fully demonstrated and explained. It was after one of these sessions that Joe picked up the idea of building a lumber stacker to improve materials handling and economize on space problems.

Being a little removed from furniture in the piano business, and a little outside of Grand Rapids at his plant in Grand Haven, Joe Snyder probably viewed the whole situation a little more objectively than people closer to it. He crystallized the spirit of Grand Rapids when he said:

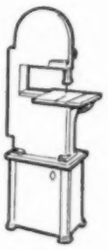
"The greatest benefits I see in the close relationship with other plants do not necessarily come in the specific ideas or problems discussed. Mixing with other people in the trade stimulates something very potent within you. It makes you feel the reality of an idea. It makes your mind more active. And it gives you a chance to unload a lot of things that bother you. The most important thing, I believe, is that spontaneous ideas are sparked off as a result of the friendly contacts."

You get MORE for LESS with

DURO POWER TOOLS

COMPARE and see...

Specifications	Duro	Brand "A"	Brand "B"
Table Size with Ext.	33"x38"	27½"x35"	32½"x50½"
Arbor Diameter	⅝"	¾"	⅝"
Depth Cut 90°	3¼"	3⅛"	3⅛"
Depth Cut 45°	2-7/16"	2⅛"	2⅛
Maximum Distance Blade Fence	25½"	25"	25"
Distance Ahead Blade	14¾"	12½"	13"
Number Belts	3	2	3
Mitre Gauge Control	Yes	Yes	No
Price	$325.00	$335.00	$334.50



The chart above gives a quick, capsule picture of Duro's circular saw superiority when compared with 2 nationally advertised models. This superiority is equally evident when the entire Duro line of power tools is compared with any of the leading makes. Tool for tool, feature for feature, price for price—Duro has been repeatedly acclaimed the No. 1 power tool buy in America! Duro Tools offer an exclusive "built in" rigidity, a lifetime ruggedness, "years ahead" design, unique safety features and precision accuracy that's unduplicated!

If you're searching for finest quality—Duro is your best bet. If performance is your prime requirement, choose Duro. If price is a major factor—Duro will give you more, much more, for less!

The complete Duro line includes circular saws, drill presses, band saws, scroll saws, sanders, lathes, jointers, routers, plus a full line of accessories. Write for the comparative facts today.

Send for FREE catalog of power tools and Comparative Chart

You'll get a graphic picture of the immense Duro line and how it compares with other nationally known power tools on a point for point basis. Write today.

DURO METAL PRODUCTS COMPANY

2661 N. Kildare Ave. • Chicago, Illinois

DURO METAL PRODUCTS CO.

2661 N. KILDARE AVENUE, DEPT. WD-118, CHICAGO, ILLINOIS

Gentlemen: Please rush me your FREE power tool catalog and COMPARISON CHART showing how Duro fares with other power tools in the woodworking market.

Name_____

Company_____

Address_____

City and State_____

IMMEDIATE service on Southern quality fasteners from factory or a warehouse near you — that's the story Southern Screw Company backs up with performance! Send us your requirements for quotation by return mail, or faster if you request it.

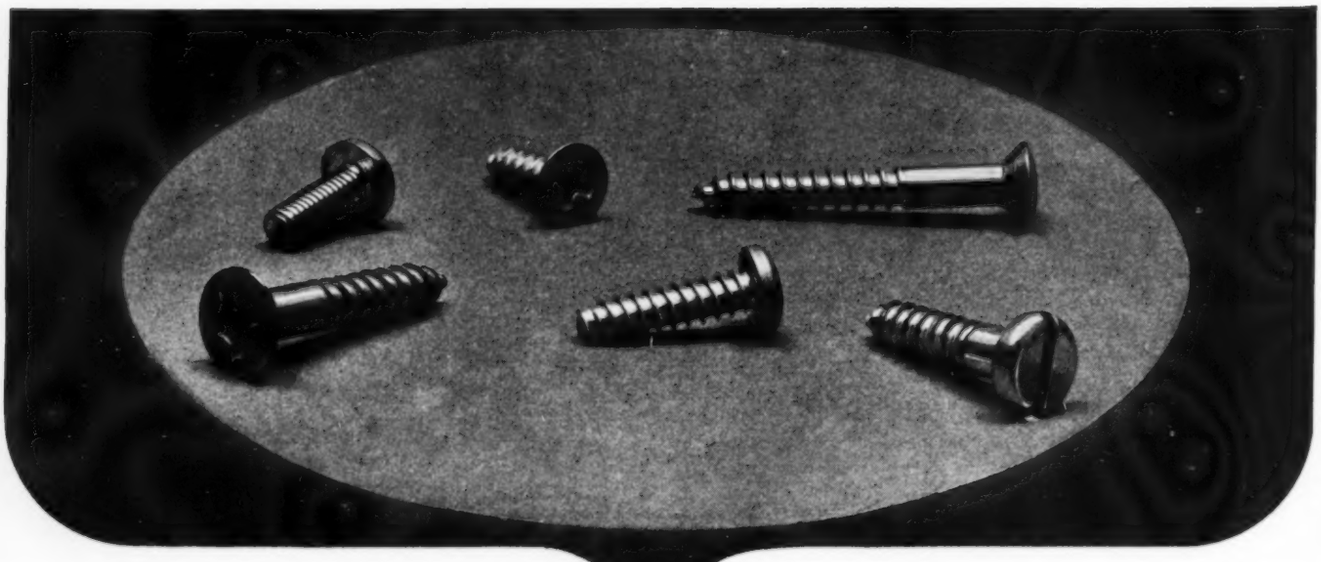
Address: Southern Screw Company, P. O. Box 1360, Statesville, North Carolina
Phone: TRiangle 3-7213,
TWX: Statesville, N. C. 48

Warehouses: NEW YORK, CHICAGO, DALLAS, LOS ANGELES

Wood Screws • Stove Bolts • Tapping Screws • Machine Screws & Nuts • Drive Screws • Carriage Bolts • Dowel Screws • Hanger Bolts

IN FASTENERS SOUTHERN IS

service



Southern
SCREW COMPANY
STATESVILLE • NORTH CAROLINA

around the shop

This monthly feature answers readers' questions on common shop problems. If you wish to present a problem, or desire further discussion of problems discussed here, write to the Editor.

How To Treat Poles?

We manufacture construction lumber which is sold mainly to a near-by rural area for farm structures. When pole-frame constructions become popular, we began to supply poles as well. Our distributors are now calling for treated poles. What preservative material process should we use?

Preservative treatment with creosote appears to be most favored for poles to be in contact with the ground. Poles for pole-frame constructions are usually given an 80 lbs. treatment of creosote by a pressure process. Only the butt is treated in many cases, allowing either a 4′ or 5′ setting depth. Minimum treatment area allows at least 2′ above the ground line, such as 6′ of the butt for a 4′ setting depth. A few concerns have reported the use of a hot-and-cold bath butt treatment as satisfactory.

Does Problem Justify Expense?

We use the same glue spreader rolls to spread both heavy and light spreads in a range of 50-70 lbs. per thousand sq. ft. of glue line of urea and phenolic resin glues. One of our glue suppliers advises that special rolls should be used for each type of spread. Another claims we could use an all-purpose roll which would do both jobs satisfactorily. Which one is giving us the correct advice?

While we don't lean to weasel-wording, there is something to be said on both sides. Most plants prefer to change rolls to ensure carefully controlled spreads. In all fairness, however, we cite experiments made which reported a roll made with double grooving, made up of heavy-cut helical corrugations and light length-wise corrugations, did successfully apply glue spreads ranging from as high as 70 lbs. to as low as 40 lbs. We would suggest that your glue spreader manufacturer be consulted.

Proper Bulb Setting

We operate a force drying oven for finish drying of our cabinet line which is equipped with wet-and-dry-bulb controls. There has been trouble recently with dimensional changes in these cabinets after they have been run through the drying oven. I believe this to be due to improper humidity control in the oven. Can you give us proper wet bulb setting for drying cycles at 120° F. and 130° F. and relative humidity conditions to maintain an E.C.M. of 7%?

Control required for relative humidity and temperature in your drying oven to hold an equilibrium moisture content of about 7% has been specified by a qualified heating engineer, as follows:

Dry bulb temperature - 120°F.; wet bulb depression - 23.5°F.; relative humidity - 42.

Dry bulb temperature - 130°F.; wet bulb depression - 24°F.; relative humidity - 45.

How Are These Edges Molded?

We are exploring the possibilities of making mirror frames as a by-product item. Can you tell us what standard corner joints are used for the various mirror frame shapes?

The corner joint used usually depends on the style of frame, its dimension and end contour. The conventional straight-side square or rectangular frame may be made with dowel joints, slot and tenon joints, or double tongue and groove lock miter joints. The semi-rectangular frame, which is usually square at the bottom and curved at the top, is with mitered and double splined joints, mortise and tenon or halved joints at the square bottom section or it may be doweled. The dowel joint is favored for fastening side members to the curved top rail and they may also be splined. Curved frames may be oval, circular or irregularly shaped and are usually assembled with dowel or double splined joints. Metal fasteners are used to reinforce all types of joints.

While much mirror frame stock is machined at the molder in multiple lengths, assembled frames are usually shaped along their inner and outer edges at the router or shaper. Outer edges are usually shaped while held in a form with the outer edge worked against a

guide pin in the router table or against the shaper collar. A combination setup is sometimes used to permit rabbeting during the same operation. Inner edge shaping may be done free hand with guide supports or may also be done with the frame support on a form cut-out in the center and worked against guide pin or collar. Some form of adequate holddown is used to hold the frame secure during machining.

How to Convince the Board

I am preparing a written proposal for a comprehensive mechanized handling system at our plant. This proposal will be considered by the board of directors. I have specific data but need a general opening which will condition the directors for the recommendations. Ours is an integrated operation, including sawmill, planing mill, pallet shop and furniture plant.

The most attractive single factor of any manufacturing process to the company directors is generally cost control. Many wood products concerns have been quick to jump on the band wagon of mechanized handling where they have been shown that substantial increase in production follows when materials or work-in-process are delivered to the individual worker and/or machine or work station at a constant, comfortable rate of speed at a convenient point where reaching or lifting is either wholly eliminated or greatly minimized.

Many of these plants have been integrated to operate at an efficient rate of production when all operations are properly combined and synchronized by a well-engineered mechanized handling system. All kinds of operations have been tied into the flow of production and paced to match the speed of the system as a whole. Mechanical delivery of parts in proper sequence and with precise timing eliminate human errors. Also, by lessening physical effort required, mental alertness can be maintained at a high level. This has the result of reducing accidents and improving quality and quantity of production.

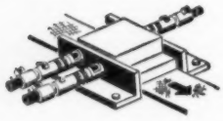
A thumb's touch does it

...4 holes drilled automatically

These closely grouped Keller "Airfeedrills"® are being used to drill four precision bolt holes in sectional garage doors. The operator presses a button and all four drills start instantly, drill to preset depths, retract and stop automatically.

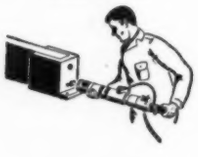
"Airfeedrills" can be used individually or as fast, low-cost multiple drilling units. They are easily positioned in almost any drilling pattern—patterns requiring holes of different size, angle or depth . . . in numbers from two to 30 or more. Here are other ways to use Keller "Airfeedrills":

Automatic drilling unit



Stationary drilling

Portable unit



Write for bulletin

ENGINEERING FORESIGHT—PROVED ON THE JOB
IN GENERAL INDUSTRY, CONSTRUCTION, PETROLEUM AND MINING

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd.,
14 Curity Avenue, Toronto 16, Ontario

60th Anniversary Issue

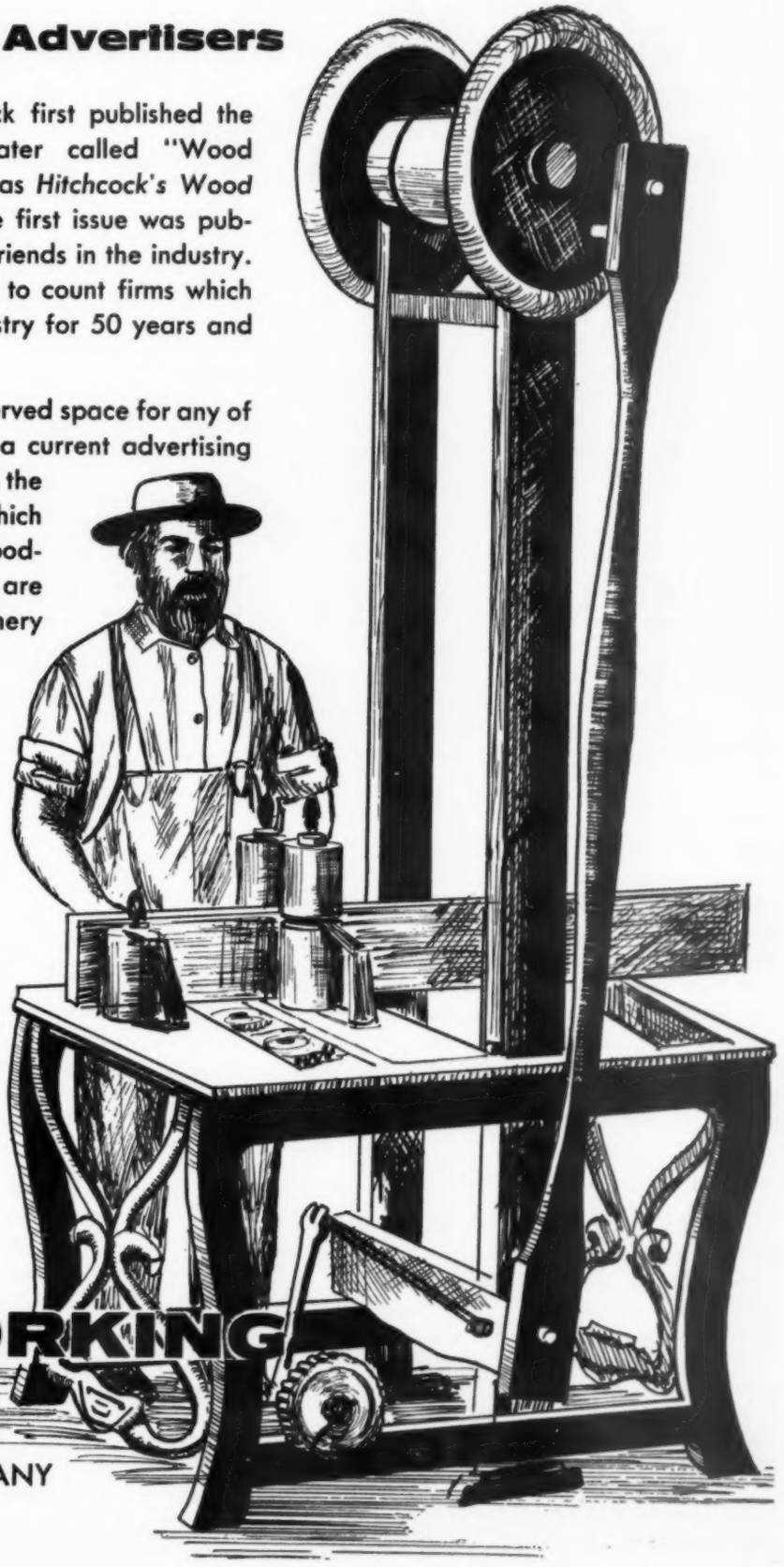
Salute to 50-Year Advertisers

It was 1898 when A. H. Hitchcock first published the "Woodworking Machinery List," later called "Wood Working Digest," and today known as *Hitchcock's Wood WORKING*. In the 60 years since the first issue was published, we have come to know many friends in the industry. Among those friends we are pleased to count firms which have supplied the woodworking industry for 50 years and more.

In this special sections, we have reserved space for any of these friends who wished to present a current advertising message and one of years gone by. On the left hand pages are advertisements which appeared in early issues of the "Woodworking Machinery List." On the right are the present day messages about machinery and supplies useful to you.

The contrast between the old and new is dramatic. So, indeed, is the progress within our industry: from wooden wagon wheels to particle board; from hand saws to carbide tipped blades; from hand finished furniture to spray painting, to name only a few of the tremendous changes.

We salute these companies who have given consistent service to our industry throughout the years. May bigger and better things await them in the years ahead.



hitchcock's

WOOD WORKING

Published since 1898 by
HITCHCOCK PUBLISHING COMPANY
Wheaton Illinois

◀ In 1907

The Oliver Machinery Company offered this Oliver "B" Universal Saw Bench.

Today ▶

There's an Oliver saw bench to fit your needs exactly. These saw benches are engineered for fast, smooth production.

▼ Joseph W. Oliver migrated to Grand Rapids from Oswego, N.Y., his birthplace, when he was 14 years old. After working for the Bissell Carpet Sweeper Company and Butterworth & Lowe, he eventually began designing his own wood trimmers and had them built by various firms. In 1891 the line consisted of No. 1, No. 2 and No. 3 trimmers, sold under the assumed name of American Machinery Co. During these early years, the company office was open only after banking hours because the office force consisted of a bank teller who came in after work and looked over the mail; kept a few records; and made up shipping tags.

By 1896, Mr. Oliver was ready to begin selling his machines abroad. He arrived in England with a specially made double harness, brightly bespangled and showy, and started on his way with a lory filled with trimmers. Mr. Oliver drove to the various pattern shops all over England where he would set up a trimmer and proceed to demonstrate this unique "Yankee" invention.

From the earliest days, the company has reached out around the world for business. Surfacers have been delivered on skids in Turkey and bumped into place by elephants in India; mules have carried them over mountain passes in far away lands.

In 1904 the first big catalog was printed. The trademark—an eagle with the new and old worlds—was first used that year and has been in constant use ever since.

January 2, 1907, was the start of the corporation. The first officers were J. W. Oliver, president and general manager; A. N. Spencer, vice-president, secretary and general sales manager. S. D. Thompson was treasurer. October 1907 expense items would sound strange now: repairs to whip, chamois for wiping buggy, etc.

By June 1909 real efforts were made to branch out into selling machines for furniture making and woodworking plants other than pattern shops.

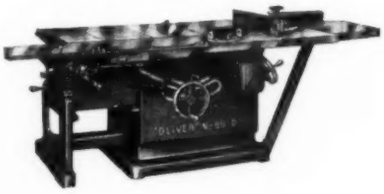
To move quickly over the intervening 40 years of progress, employment by 1949 was 405 with 74 families being represented. In the last few years, Oliver has acquired additional space for foundry office and a new pattern shop.

Today, as for half a century and more, Oliver meets the needs of the industry with a combination of courage, resourcefulness, inventiveness, initiative, aggressiveness, and good old-fashioned horse sense.

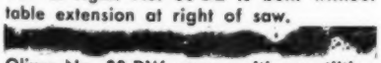
Today... Oliver Saw Benches are engineered to meet every need for fast, smooth production. This Oliver Miter Saw simplifies the handling of large panels

SIX MODELS OF EXTRA LARGE CAPACITY

Oliver No. 88-DX Miter Saw has a large main table, and an extension at right of saw. No. 88-DXL has greater crosscut capacity and a larger rolling table.



Oliver No. 88-DY has a special rolling table at left of the saw, and table extension at right. No. 88-DZ is built without table extension at right of saw.



Oliver No. 88-DW comes with non-tilting arbor, and a table extension at right of saw. Has rolling table at left of saw. No. 88-DWL has greater crosscut capacity and larger rolling table.

Now you can choose the Saw Bench that fits your needs exactly! The No. 88 Miter Saw is built with the power, stamina and speed for high production work. Yet it is also the choice for many smaller shops.

Just look at its many advantages. The saw arbor tilts at any angle up to 45 degrees. It rips, crosscuts, dadoes, gains, grooves, and cuts a perfect miter with utmost smoothness and precision. Accuracy is maintained at highest speeds.

An 18-inch saw projects 4 ¾ inches through the table having 4 ½ inches vertical adjustment. Rips up to 50 inches wide. Crosscuts up to 48 inches—1 inch thick.

The Oliver No. 88 Miter Saw has the latest deepgroove bearings. Only the finest materials are used in its construction. And it is built to the highest machine tool standards.

Moreover, it is equipped with the most accurate and convenient set of graduated gauges ever developed for a saw bench to reduce set-up time.

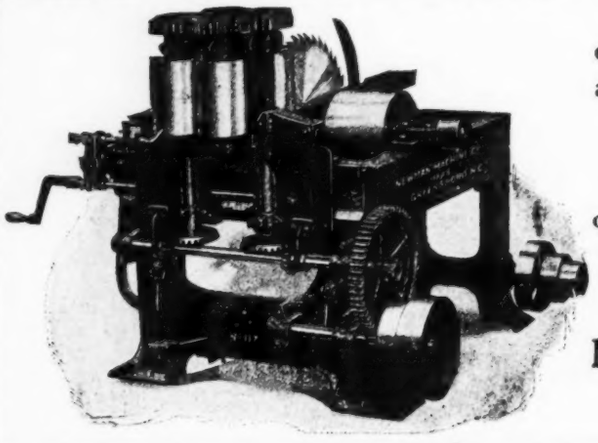
There's an Oliver Saw Bench to fit your needs exactly. Tell our engineers your needs. Or write today for bulletins.

Oliver also makes a 38-inch Band Saw, heavy duty Jig Saws, and the newest Brazer for band saw blades. Write today for bulletins.

OLIVER
SINCE 1890

OLIVER MACHINERY COMPANY
Grand Rapids 2, Michigan

PERFECTLY TRUE RESAWING



can only be accomplished on a perfectly built machine

We have it, six sizes.

All adjustments easily and quickly made.

Ask for Catalog "W"

Newman Machine Co.
P. O. Box 855
Greensboro, N. C.

◀ In 1910

The Newman Machine Company was marketing a number of machines. In addition to this resaw, the firm made a line of planers and matchers and also lath mills.

Newman Marks 51 Years of Growth

▼ One of the first machines developed by the Newman Company was a lath mill and bolter, which served the need for volume production of wood laths used extensively at that time (about 1907), and the demand for the machine launched the small company on the road to leadership among woodworking machinery manufacturers.

Early in the history of the Newman Company a four-sided planer and matcher was designed for the small lumber plants. This machine was the Newman No. 8, improved models of which have been installed in 1261 small planing mills since 1910.

The modern Newman M-68 direct motor driven planer and matcher shown at top left of the opposite page is a descendant of the earlier Newman planers and matchers. It is a six-roll all electric medium feed machine with feed speed to 175 f.p.m.

For the planing mill, Newman's line of woodworking machinery now includes six models of planers and matchers, two of which are completely motorized, automatic pineapple feed tables, end trimmers, cutterhead grinders and automatic knife grinders.

The Newman Machine Company is continuing to expand its present markets, and to open new fields with machinery produced by engineering know-how and mechanical skill. The growth and success of Newman in the relatively brief period of 51 years has been great, but the company looks forward to greater accomplishments in the years ahead.

Newman officers, engineers and production men are directing their efforts toward raising quality standards to the end that Newman machines will be known throughout the woodworking and metalworking fields as precision machines for service.

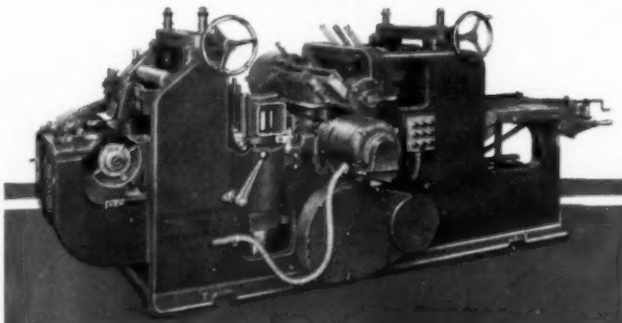
Today ▶

Newman offers a variety of machines for today's woodworking needs. The modern Newman M-68 direct motor driven planer and matcher—shown at top left of the opposite page—is a descendant of the earlier Newman planers and matchers. It is a six-roll all electric medium feed machine with feed speed to 175 f.p.m.

NEWMAN

M-68

DIRECT MOTOR DRIVE



PLANER & MATCHER

A six roll ALL ELECTRIC medium feed machine

Feeds to 175 feet per minute. Feed gears heat treated and interchangeable. The M-68 DMD is extremely close coupled to insure ACCURATE SIZING WITH SUPERIOR FINISH

HORSEPOWER

Top Cylinder: 40 — Bottom Cylinder: 20 — Profiler: 15
Side Heads: 15 and 20 — Feed: 7½

NEWMAN MACHINE CO. INC.
Greensboro North Carolina U.S.A.

NEWMAN K-20

WILL TRIM FROM 5' TO 20' LENGTHS

DOUBLE END TRIMMER

Either saw unit may be left stationary while the other saw unit is moved. Accuracy of 1/32" or better can be maintained. Individual V-belt drive to each saw arbor. Variable feed with speeds from 20 to 60 cuts per minute. Saws are standard 22" diameter and can be changed in a few seconds. Special saw collars available. Write today.

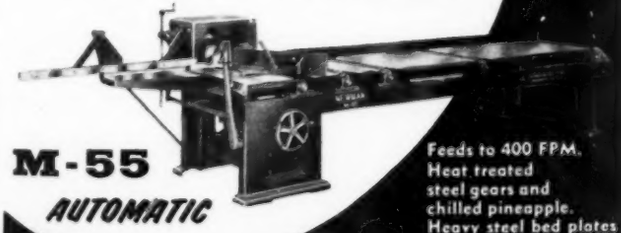
NEWMAN MACHINE CO. INC.
Greensboro, North Carolina, U. S. A.

SAVE LABOR

Increase your output with the

NEWMAN

PINEAPPLE FEED TABLE



M-55
AUTOMATIC

Feeds to 400 FPM. Heat treated steel gears and chilled pineapple. Heavy steel bed plates between rolls.

Feeds stock automatically to high speed PLANERS AND MATCHERS
Keeps stock butted at highest rates of feed.
Adjustable angle bumper with positive lock.
All controls and adjustments centrally located.
Quick release lever for simultaneous raising of top roll yokes and outfeed lumber holddown.
Write today for full details and specifications.

NEWMAN MACHINE CO. INC.
Greensboro North Carolina U.S.A.

NEWMAN G-20

GRINDS PLANER CHIPPER AND HOG KNIVES

DOUBLE KNIFE BARS

Full rotary action. Non reciprocating.

Continuous grinding motion for wet or dry grinding.

Grinds 8 knives at one operation.

Automatic

Knife Grinder

The NEWMAN G-20 is recommended for precision grinding of planer knives and all types of knives which can be ground by making a straight pass across the face of the knife. Will grind 8 knives 20" long or 6 knives 27" long. 160 inches of knives can be ground in floor space 42" x 43".

NEWMAN MACHINE CO. INC.
Greensboro North Carolina U.S.A.

ASK US ABOUT

LATH MACHINERY

This is our Iron Frame Combined Lath Mill and Bolter

IF you want lath machinery of any kind, there are some good reasons why you should buy Challoner Machinery. Anyway, it would be a mistake to buy from some other line without at least letting us tell you why we think—and hundreds of users think—that the Challoner Lath Machines are the best lath machines in the world.

Ask us about the machine you want. . . Drop us a card to-day for catalogue and full particulars

CHALLONER COMPANY
OSHKOSH, WIS.

◀ In 1901

The Challoner Company offered lath machines—"the best lath machines in the world."

Today ▶

C. K. L. Machinery Company offers a complete line of Challoner machinery. Outstanding in the line are the pieces of equipment used for making the currently popular louvered doors and shutters.

Challoner Company Progresses From Lath Machinery To A Highly Developed Line and Automatic Feeds

▼ Back in 1866, George Challoner, over in Omro, Wisconsin, struggled with ideas that concerned woodworking machines. Later his sons, John and Frank, struggled to improve what their father started and in 1887, they moved "lock, stock and barrel" to what was the enterprising city of Oshkosh. Then on to better machinery.

In 1905 Wilkin-Challoner Company came into being. Founded by Theo S. Wilkin, Chas. W. Radford and John Challoner, it was continued until 1945, when by liquidation of the Wilkin-Challoner Company, a new company, the C. K. L. Machinery Company, was formed. The business was taken over in 1921 by John Challoner, George Challoner and Frank Challoner, and in turn, under C. K. L. Machinery Company, the business was taken over by Frank Challoner, Frank C. Challoner, Robert J. Lewis, Henry W. Kratsch and Arthur E. Kratsch. Through the years its officers continued to develop new and better methods for use in the woodworking field until today it offers a most highly developed line of double end tenoners, double cutoff saws, sash and door machinery, flush door and panel sizers, wallboard units, louver door mortisers, gang stile borers and gang mortisers.

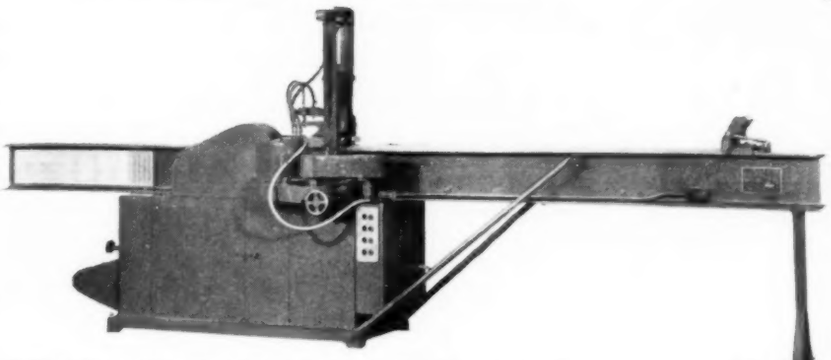
Machinery "above the standard" had been the slogan for the company for years, and today Challoner woodworking machines are still being built acording to the slogan "above the standard."

Automatic feeding combinations stop the "pick 'em up and lay 'em down" practice, as you evidence in the finest door sizing tandem units shown on the next page.

Challoner

"SINCE 1866"

"CHALLONER" NO. 775 AUTOMATIC BLIND AND LOUVER DOOR STILE MACHINE:



RANGE: Stock width—¾" to 2".
Stock height—1" to 6".
Length—up to 97".
Angle 0° to 36°.
Length of slot—1" to 2¼".
Number of holes—up to 84.
Depth—to ½" deep.
Spacing of holes—⅞" to 2".

FEED: From 40 to 80 strokes per minute; stock fed from hopper continuously.

MOTORS: 1—½ H.P. 1200 RPM Feed Motor.
2—1 H.P. 3600 RPM Spindle Motors.

CONTROL: Motors controlled indiviually from Push Button Switch Panel mounted on machine handy to operator. Switches complete are mounted in steel cabinet attached to machine. Automatic Feed controlled by limit switches and air operated clutch with relays in control cabinet.

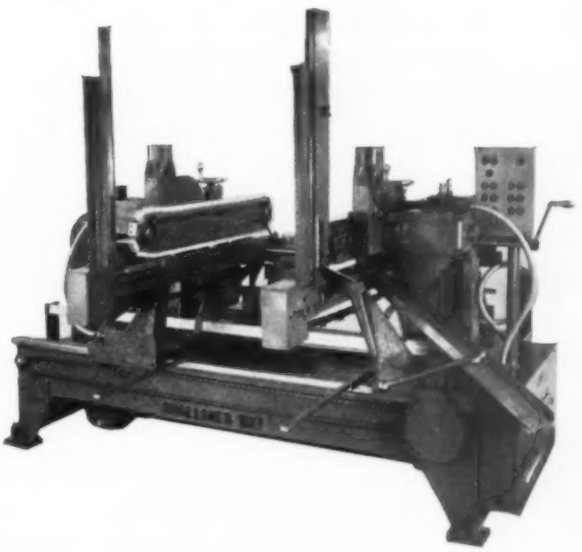
SPINDLES: Ball Bearing Spindles driven by flat speed-flex belt at 25,000 RPM. Oscillation drive through V-belts to adjustable crank at 500 RPM.

BITS: 2—⅜" Shank High Speed Tool Steel Bits.

ADJUSTMENTS: For Stock Length—positioning of limit switch dogs.
For Stock Height—by handwheel.
For Stock Width—by handwheel.
For number of holes—positioning of limit switch dogs.
For spacing of holes—by change gears.
For length of cut—by screw adjustment.
For angle of cut—by moving on pivot.
For depth of cut—by positioning bit in spindle.

FLOOR SPACE: 45" x 17'0".

"CHALLONER" NO. 527 LOUVER DOOR SLAT CUT-OFF AND POINTING MACHINE:



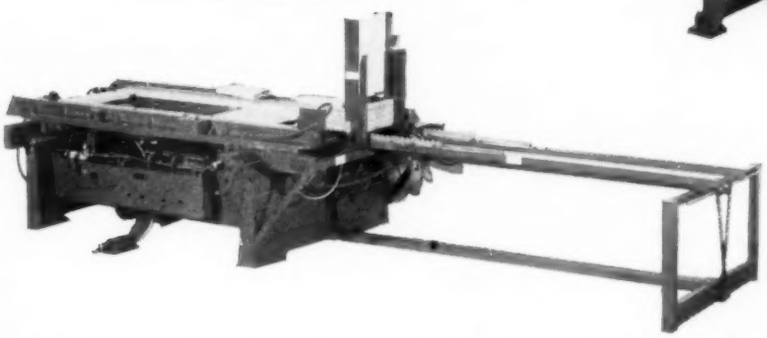
RANGE: Length—4¾" to 48".
Width—1" to 2¼".
Thickness—½" to ⅜".
Load Space 8".

FEED: Variable drive to feed slats from hopper at 60 to 125 slats per minute. Slats automatically return to operator.

HOLDDOWN: Traveling Rubber Padded Type.

MOTORS: Two (2) 2 H.P. Saw Motors.
Two (2) 1½ H.P. Cope Motors.
Two (2) 1 H.P. Pointer Motors.
One (1) 1 H.P. Feed Motor.

CUTTERS: Two (2) 12" Saws.
Four (4) 8" Beveling Cutters on Copes.
Four (4) 3¼" Edge Pointing Cutters on high speed, belt driven spindles.



"CHALLONER" NO. 727 MOTORIZED LOUVER DOOR AND BLIND CLAMP:

RANGE: Door width—12" to 48".
Door length—up to 96".
Stile width—2" to 5".
Slat length—8" to 40".

ADJUSTMENTS: For Door Width: Positioning of Limit Stops.
For Slat Length: by handwheel.

FLOOR SPACE: 64" x 16'4".

OPTIONAL EQUIPMENT

For arranging Slat Loader as for clamping doors with vertical munt, for clamping two blinds or doors.

RANGE WHEN USING AS DOUBLE:
Door widths—8" to 18".
Stile widths—1½" to 3¼".
Slat lengths—4½" to 14".

MOTORS: 5 H.P. High Torque Reversible Ball Bearing Motor with brake connected to worm drive shaft through sprockets and roller chain.
½ H.P. Feed Motor to automatically pick slats out of hopper and place them in clamping position.

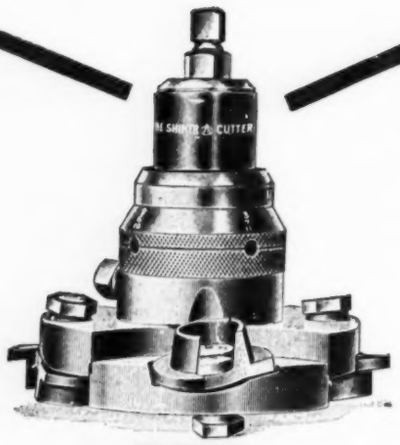
CONTROL: Clamping motor operated by foot treadle switch, wired so clamp closes when toe of the foot switch is pressed and opens when heel is pressed. Limit stops in both directions operated by control rod. Closing limit stop has micrometer screw setting.
Feed Motor controlled by momentary start switches and automatic stop switches, one set for the infeed, and one set for the return stroke.

RACK BARS: Machine provided for removable rack bars to be custom made for each set-up, to support the proper number of slats at the correct angle and spacings. These may be made of aluminum, or steel.

C. K. L. MACHINERY COMPANY

WOODWORKING MACHINERY

OSHKOSH, WISCONSIN



THE SHIMER CUTTER HEAD

is made of forged steel that will stand a tensile strain of 60,000 pounds to the square inch, and embodies all the improvements our thirty years of experience has accumulated

May We Send Catalog 26?

Samuel J. Shimer & Sons, Milton, Pa.

◀ In 1901

Samuel J. Shimer & Sons offered this expansion cutterhead. The Shimer company, along with the cutterhead department of Gustafson & Scott, John Kuehnle & Sons, Bailey & Blendinger Co., and the Anderson Knife and Bar Co., has since been acquired by the Wisconsin Knife Works.

Today ▶

By internal growth and by purchase (as seen above), the Wisconsin Knife Works has become one of the largest makers of woodworking cutterheads and is one of the leaders in the industrial machine knife field as well.

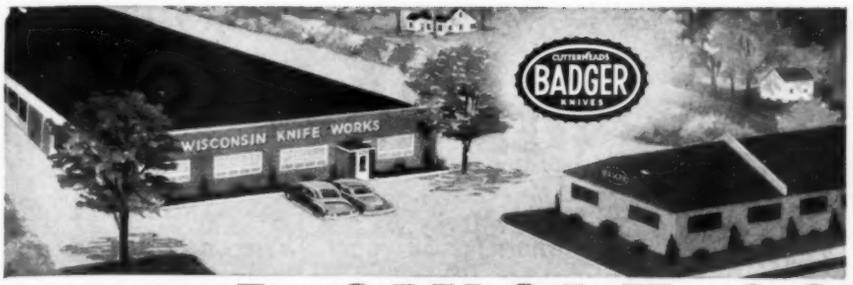
▼ The Wisconsin Knife Works, formed in 1926 to manufacture cutterheads and knives, has had as its slogan: "Engineers to the Woodworking Industry." An excursion through a few of the firm's catalogs leaves the impression that all the skills of the old-time workers in wood have been translated into modern, high speed tools. There are cutters which can reproduce the most intricate of fine moldings and joinery, and shapes for any number of decorative or structural purposes. But there is one important difference between the products of this equipment and those which were once fashioned laboriously by hand: the modern patterns can be reproduced almost infinitely and joined more perfectly than hand fitting could ever permit.

Countless problems in the production of wood products have been solved by the designing of special cutters, knives and heads to do a new type of job. Wisconsin Knife Works, for example, developed a "finger joint" head in the late '20's for cutting a series of matching fingers in the ends of two pieces of wood. Interlocked, the two pieces were spliced to make a longer, more usable piece of stock. This technique met with particular success in the automobile body factories of that time.

During World War II, the company did extensive work with carbide cutting tools for both the wood and metal working fields.

Precision and skill go into the manufacture of Wisconsin Knife cutting tools. All Badger bits are precision ground for accuracy and finish; no milled bits are merely milled finish. They are made of the finest high speed tool steel heat treated scientifically for maximum wear and "tough" hardness. After being machined and ground to the closest of tolerances each pattern is projected on a 50-1 comparator to insure accuracy.

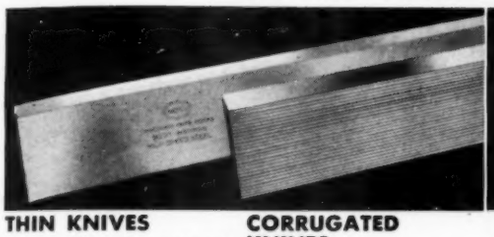
With this careful, scientific attitude, Wisconsin Knife Works will be serving the new needs of the woodworking industry in the years ahead.



ONE MODERN, TRUSTWORTHY SOURCE.
For over thirty years, specializing in manufacture of heavy duty, high production cutterheads and knives. Skilled woodworking job planners, cutter design specialists, metallurgists, together with precision modern machinery assure you longest cutter life, accurately ground patterns, prompt delivery.

A SINGLE SOURCE

FOR ALL YOUR WOODWORKING CUTTERS AND KNIVES



THIN KNIVES
Best quality high speed steel, controlled heat-treating and precision grinding produce durable knives that give more service and finer finishes.

CORRUGATED KNIVES
The sharp, clean corrugations are ground in the bar after it is hardened. Recommended for safety when using hand ground knives on deep cuts.

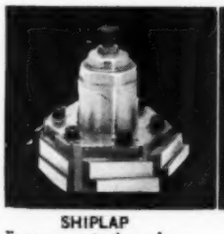
MILLED-TO-PATTERN BITS
Made of high speed steel, heat-treated for maximum wear and toughness. Precision ground for accuracy and finish to meet your exact requirements. Many tongue and groove, paneling and moulding bits are in stock.

SLOTTED KNIVES
Solid tool steel—heat-treated and tempered for hard, long-lasting cutting edge and with the slotted end drawn back for maximum toughness. Available either straight or ground to your pattern. Popular sizes in stock. Patterns ground to order.

SHAPER STEEL
Micrometer accuracy produces inter-changeable knives from any bar of BADGER shaper steel. All popular sizes—either plain or notched for safety collars—available from stock for immediate delivery.

CHIPPER KNIVES
Finest alloy steels are selected for each job—precision grinding—careful heat-treating—all add up to create a knife that will turn out clean, uniform chips at top efficiency. BADGER—B & B Chippers speed production and reduce down time.

VENEER KNIVES
BADGER—B & B Veneer Knives are custom made and engineered for your specific job. You get knives that last longer between grinds and reduce down time. You can see the quality in the polished face and superb cutting edge.



SHIPLAP
For economical production of shiplap siding, paneling, decking, etc., use BADGER shiplap bits and heads. Clamp "T" slot type shown. Also available in round head type.

TONGUE & GROOVE
Clamp "T" slot matcher heads with inter-changeable high speed steel bits. Increased production by taking advantage of the easy change over from one set of bits to another.

DROP SIDING
High speed steel drop siding bits and a BADGER clamp "T" slot head—on the profile spindle of your matcher—will give you highest possible production rates.

PICKWICK PANELING
This profile head can be used on either a moulder or planer-matcher. Accurately ground milled-to-pattern bits faithfully duplicate the pattern from one run to another.

SQUARE HEAD
A notable feature of all BADGER square heads is the relief in back of the lip. This assures positive knife retention under all types of working conditions.

ROUND HEAD
This head is adaptable to many uses. Mainly jointing and detail work with ground-to-pattern knives. Available with any number of knives — either plain or corrugated back.

FINGER JOINT
Utilize short lengths of stock by finger jointing with BADGER CFJ head. Heavy duty unit for use on tenoners and special machines. One head will finger joint various thicknesses of material.

NOTCHED SOLID | NOTCHED BALL BEARING | SOLID BALL BEARING | SOLID SOLID

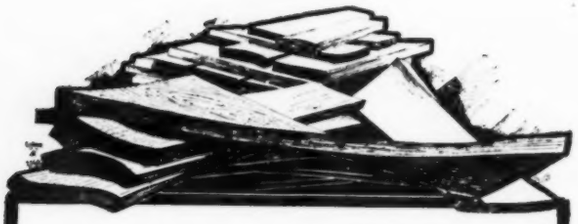
BADGER Safety-Lock, Ball Bearing and Solid Shaper Collars give you safety-plus on all your shaper operations. Made with extreme accuracy for true inter-changeability. In stock.

SHIMER BADGER B&B

WISCONSIN KNIFE WORKS

BELOIT, WISCONSIN

Engineers to the Woodworking Industry



All Kinds of Lumber

Rough and uneven as it comes from the saw, warped and twisted in the process of drying, is carried to the planer to be dressed over. For this reason a surface planer is a very important machine in any woodworking factory. The planer that will reduce the amount of scraping, sanding and handwork necessary to a final finish will prove by far the most economical.

Whitney Planers

whether single or double surface, are equally adapted for work requiring very high quality of planing; or where quantity alone is desired, even in the latter case the surfacing is superior.

We have an illustrated descriptive folder giving full details of WHITNEY Planers—yours for the asking.

BAXTER D. WHITNEY & SON,
WINCHENDON, MASS.

Foreign Agents:

Henry Kelley & Co., 26 Pall Mall, Manchester, England.
Schuchart & Schutte, Berlin, Cologne, Brussels, Vienna, Stockholm and St. Petersburg.
Sussfield, Lorsch & Co., Paris, France.

◀ In 1901

The Baxter D. Whitney Company has been building planers for 38 years. These early planers embodied Mr. Whitney's original ideas and innovations. Long before 1901 the Whitney machines were winning awards and medals in Europe and America. At the outbreak of the Civil War, the Whitney machines were employed to produce stocks for the new Springfield rifles.

Today ▶

The Whitney machines occupy a position of prominence in the woodworking machine industry. A list of Whitney users includes many of the oldest and largest furniture manufacturers as well as the small discriminating users of fine equipment in the United States and many foreign countries.

Baxter D. Whitney Company Began Building Planers in 1868

Almost a Century Later Whitney Still Recognized As Leader

▼ Whitney machines are produced from long experience, engineering know-how and constant research. Today research engineering is continuously working to improve equipment; to develop even finer machines for the coming march of automation processes and conveyorized methods of manufacture in the woodworking industry.

Whitney products include the S-290, 4 roll production surfacer built in 11 widths, the S-480 4 roll roughing surfacer, the S-205 medium duty cabinet surfacer and the S-970 8-roll A line of heavy duty and medium duty hand A line of havy duty and medium duty hand and automatic shapers are now in production together with routers, variety saws, automatic facers, gauge lathes, variety saw benches, stave saws, vibrating bit mortisers, and hollow chisel mortisers.

Today Whitney engineers are successfully meeting the challenge of the new wood surfacing, the particle board (chipboard) and other wood products, Masonite and plastic products. These products and tomorrow's blueprints of pace-setting Whitney woodworking machines are the fulfillment of the dream of young Baxter D. Whitney back in 1837. His goal: Practical machines doing an efficient job, solving the woodworker's problems year after year.

Whitney

DOUBLE SURFACER

The World's Finest Cabinet Planer

Engineered for Higher Quality Precision with Maximum Output

- Any feed at the touch of the handwheel
- Direct reading feed indicator
- Chrome pressure bars and chip breakers
- High speed tool steel insert on center table
- All controls grouped in one console
- Plug-in outlet for grinder
- Power hoist raises and lowers bed
- Micro feed selector
- Inside jointer for bottom cutterhead
- Simultaneous pressure bar adjustment
- Simultaneous lower roll adjustment
- .001" dial inside of handwheel for bed setting
- Automatic or one-shot lubrication
- Interlocked brakes for cutterheads
- Automatic knife grinder for cutterheads
- Mist lubrication for carbide knives

WRITE FOR FULL DETAILS AND SPECIFICATIONS

WHITNEY — QUALITY PROGRESSIVENESS EXPERIENCE — EST 1937

BAXTER D. WHITNEY & SON, INC.
Greensboro, North Carolina, U. S. A.

ATKINS'

SILVER STEEL

SAWS

Are Made from the FINEST STEEL

The Temper, Workmanship & Finish are the BEST

Write for Sawyer's Hand Book

E. C. ATKINS & CO.

Incorporated

INDIANAPOLIS, IND.

BRANCHES:

Memphis, Tenn. — **Atlanta, Ga.**
Minneapolis, Minn. — **Portland, Ore.**

◀ In 1901

E. C. Atkins & Co. had progressed far from the one-room saw repair shop opened in 1856 by Elias C. Atkins. By 1907 there were more than 40 items listed as "new goods added" in the catalog. About 600 people were employed by this company at the turn of the century.

Today ▶

The current Atkins catalog lists more than 13,000 stock items, plus facilities and experience to turn out more than 25,000 different kinds of wood-cutting and metal-cutting saws and associated hardware items. The main plant occupies four city blocks and there are warehouse outlets in five principal cities.

▼ Last year, Atkins celebrated its 100th birthday. A cake to accommodate 100 candles would be as big as a redwood stump and a list of the company's achievements, its many "firsts" in the saw-making industry, would look like a chronology of progress during the past 100 years.

Elias C. Atkins opened a saw repair shop in Indianapolis in 1856. There were no skilled laborers in the tiny plant and no salesmen to sell the products when Atkins began manufacturing saws. Therefore, Atkins did it all himself, smithing four or five days a week, selling and keeping books in the remaining hours. Within a few years, he was ready to spend a considerable sum in experiments and tests, seeking improved methods in the treatment of steel. Atkins tried several formulas and finally settled on one described as "razor steel."

The young sawsmith promptly placed an order for 5000 plates and it was from these plates that Atkins fashioned the first of the now-famous "Silver Steel" saws. In 1876 the 20-year old Atkins Co. won a first medal for quality at the Centennial Exposition in Philadelphia. In 1885, Atkins became the first manufacturer of bandsaws in the U.S.

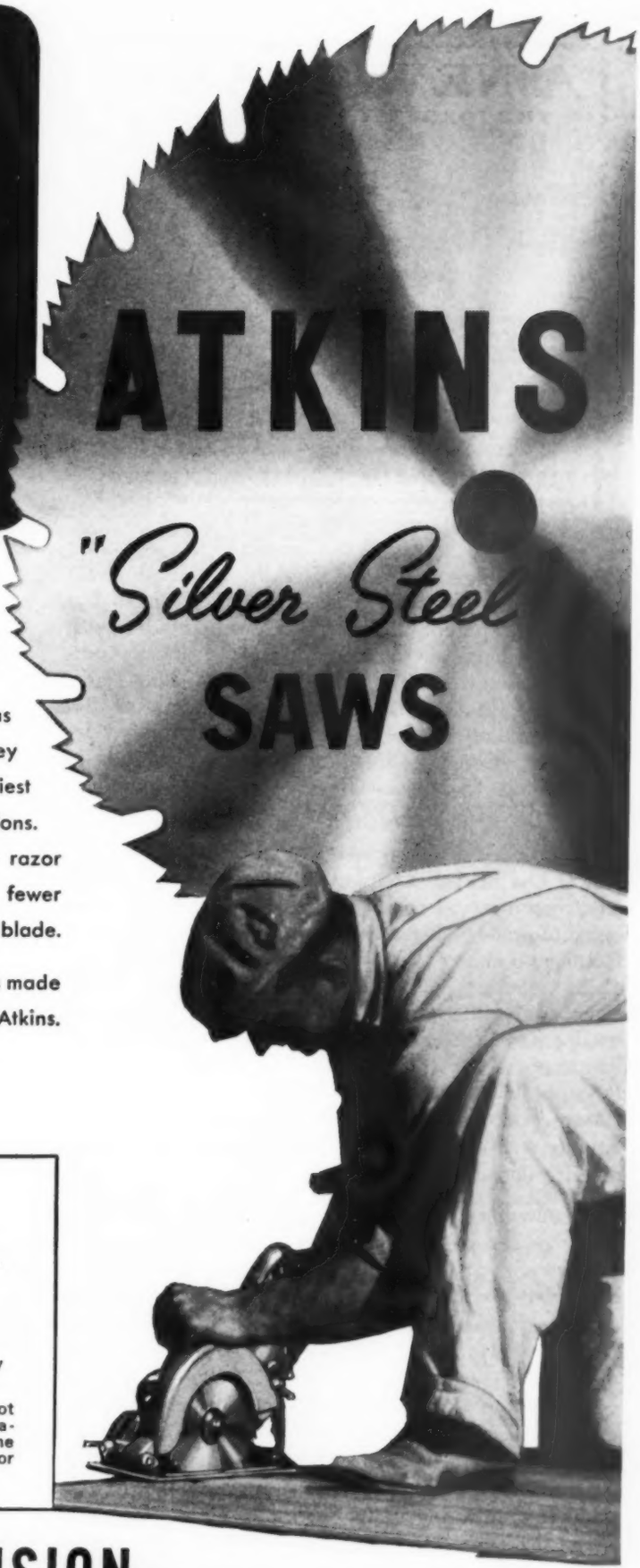
The Atkins name and fame spread far beyond national boundaries, as over seas markets took cognizance of American Technology. At the International Sawing Contest held in Tasmania in 1899, Atkins saws took first prize.

At the time of his death, 1900, the company founded by Elias Atkins was a sizable business, employing about 600 people. The company has carried on under a succession of Atkins family members, first Elias' son, H. C. Atkins, who managed the company till his death in 1944, aided during much of the time (1903-1930) by an uncle, W. A. Atkins. From 1944 through 1952, the company was run by a triumvirate of H. C.'s sons: E. C., K. W. and H. C. II. The company passed from family ownership in September, 1952, with its acquisition by the Borg-Warner Corporation.

In 1925, Atkins introduced the first high speed steel hacksaw blade. The "chamfer tooth" hacksaw blade was introduced in 1955. In this patented process every cutting tooth of the blade is "chamfered" at a carefully calculated angle to produce a cleaner, smoother slicing edge.

This development is typical of the many improvements Atkins has brought about in their 100-year history. That 100 years, so the company believes, provides an excellent background for the second hundred years—a future that will show this company supplying the needs and developing improved cutting tools for the woodworking industry.

Bring Out the BEST IN YOUR POWER SAWS

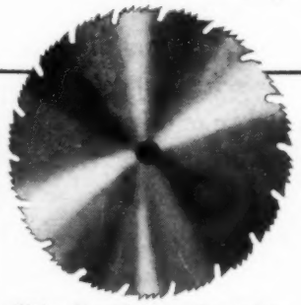


Your power machines are only as good as the saws you put in them. To get the peak performance they were made to deliver, equip them with Atkins "Silver Steel" Saws.

For when the going is rough you can count on these Atkins Saws to smooth out the job and end bottleneck jams. They cut fast and clean—run cool and easy even in the gummiest wood. And they stand up under the toughest conditions. Their famous Atkins "Silver Steel" takes an edge that's razor keen and holds it for longer cutting periods. You have fewer blade changes with an Atkins, more productive hours per blade.

Rip, crosscut or mitre—whatever the job, get the saw that's made to bring out the best in your power saw machines. Get Atkins.

Write today for full information!



Atkins No. 37 Mitre Tooth Saw, shown above, is a combination rip, crosscut and mitre saw—highly popular with users of portable machines. Pictured at right are two of many other available tooth styles.

Rip tooth, for smooth high-speed ripping.

Crosscut tooth, for fast, easy crosscutting.

Note: While Atkins does not manufacture portable machines, many leading machine manufacturers look to Atkins for blades,

ATKINS Silver Steel SAWS

ATKINS SAW DIVISION
BORG-WARNER CORPORATION
Indianapolis 9, Indiana

ATKINS B-W BORG-WARNER

Branches: Chicago, Philadelphia, Chattanooga, Los Angeles, Portland, Oregon

Export: Borg-Warner International, 36 S. Wabash, Chicago 3

A NEW CLAMP
THE JORGENSEN ADJUSTABLE
A single clamp takes any of these positions or any modifications of them. Adjusts to any angle, avoiding the necessity of squaring up irregular surfaces. One jaw can be made to overlap the other, as shown, a very desirable position, not obtainable with any other clamp. Right and left thread to screw gives double the speed of any other clamp. Has a tighter grip, obtained with less power. Glue will not adhere to the spindle and cause the threads to strip.
Will Outlast Three Old-Style Clamps
A Thousand Purchasers Say it is Indispensable
ADJUSTABLE CLAMP CO., 1201 Unity Bldg., Chicago

◀ In 1901

desk space and a one-man shop in a near-West side Chicago loft building. Its business consisted of the manufacture and sale of only one type of clamp - the patented, "adjustable" steel spindle Handscrew which since has become famous under the trade-mark "JORGENSEN."

▼ The "Jorgensen" steel spindle handscrew was a considerable innovation at that time. Prior to the "Jorgensen" patent, handscrews were made with wooden screws, or "spindles," and in those comfortable days it was not always easy to alter tradition. Consequently, the obvious advantages of the "new" kind of handscrew had to be promoted by effective personal "selling," supplemented by ads in the leading trade journals of the time, including "WOODWORKING DIGEST."

The practical advantages of a quality product, reasonably priced, coupled with effective management, good service, and constant advertising all combined to produce a steady growth for this young, manufacturing concern. Over the years, its single item of manufacture has expanded into more than 40 designs of hand clamps as described in the current catalog of Adjustable Clamp Company. "Jorgensen" handscrews are still produced in large quantities, but that trade-mark now includes a variety of "C" clamps, bar clamps, and the like along with the equally well-known "Pony" clamp fixtures, "C" clamps and similar items.

Inasmuch as the firm was first brought into existence by reason of a "new" idea, it is not strange that much of its growth into its present position of leadership has resulted from innovations and improvements which it has introduced in the field of "hand clamps." The use of steel screws (in place of malleable iron) in ordinary "C" clamps; the development of the "multiple disc clutch" holding mechanism, which has proved to be so efficient; the invention of a successful "clamp fixture" using ordinary black pipe as the bar (Adjustable Clamp Company first introduced their "Pony" clamp fixtures in 1928); the scientific design of patterns and constant test of production parts; the announcement of "Jorgensen" hinged clamps a year or two ago; even improvements in packaging for the benefit of distributors and users alike—these are some of the reasons why Adjustable Clamp Company has endured far beyond the average corporate life—and is still growing.

Today ▶

The modern plant of Adjustable Clamp Company is housed in three substantial factory buildings in Chicago's industrial West side; production is devoted exclusively to the manufacture of "JORGENSEN" and "PONY" clamps—in all their catalog varieties. The Company passed its fiftieth birthday some years ago, and occupies an enviable position as SPECIALISTS in its field. Quality of product, service to its customers and friends, and leadership are the intangibles that Adjustable Clamp Company depended on years ago—and today, as well! Adjustable Clamp Company consisted of

"Jorgensen" REG U S PAT OFF and "Pony" REG U S PAT OFF

CLAMPS

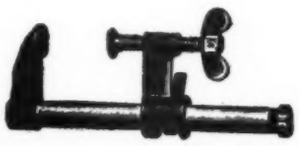
MFD. BY ADJUSTABLE CLAMP COMPANY

"Pony" CLAMP FIXTURES

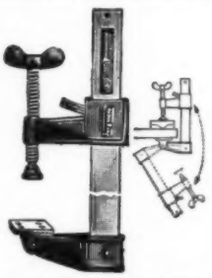
Make ideal bar clamps on ordinary black pipe. "Multiple-Disc-Clutch" will not slip or crush pipe — holds securely — releases easily.

NO. 50 Mounts on ¾" black pipe. The most popular, generally used number.

NO. 52 Mounts on ½" black pipe. Low in price—light in weight.



NO. 56 Mounts on ¾" black pipe. Often used in place of "C" clamps.



"Jorgensen" HINGED CLAMPS

A NEW IDEA in the clamp field. Mount on any bench, jig, fixture or sawhorse; hang out-of-the-way when not in use; swing up into clamping position when wanted. Slide in steel track for "sideways" adjustment if desired. 4 styles—24 sizes.

STYLE NO. 32 "Pony" Spring Clamps

Spring-operated, extra hands for hundreds of uses. 4 sizes—4", 6", 9", 12" jaws.

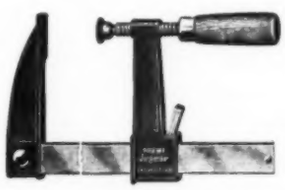
Recognized and preferred in the Woodworking Industry for nearly 60 years—as the finest, at prices no higher than those for ordinary clamps. Specify and insist upon "Jorgensen" and "Pony."

"Jorgensen" HANDSCREWS

Properly seasoned hard maple jaws grip all work securely. Wide angle of adjustment between jaws permits secure holding and even distribution of pressure on either flat or angular work. Cold drawn steel spindles. Still the favorite after fifty years. 12 sizes—4" thru 24" jaw lengths.

STYLE NO. 62 "Jorgensen" BAND CLAMPS

For clamping round or irregularly shaped objects — chair or sofa frames, columns, drums, tanks, etc. Canvas band regular steel band optional. Band length, 10 ft. and up.



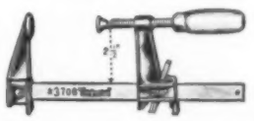
"Jorgensen" Deep BAR CLAMPS

"Multiple-Disc-Clutch" provides instant adjustment. Holds securely, releases easily. Available in 10 styles, from 4" capacity and up.

STYLE NO. 70 "Jorgensen" I BAR CLAMPS—Long-time favorite for industrial and craft use. Greatest strength—instant "Multiple-Disc-Clutch" adjustment. Two thru 8 ft. capacities. Other "flat" bar and "notched" bar designs available.

"C" CLAMPS

"Jorgensen" and "Pony" "C" clamps are produced in a large variety of styles and sizes to meet all industrial requirements, ranging from ¾" to 12" capacity—and in "light thru "heavy duty" designs.



NO. 37 "Jorgensen" BAR CLAMPS

Features new "extended" Multiple-Disc-Clutch. 4 sizes—6", 12", 18", 24".

This 32-page CLAMP CATALOG

Yours for the asking. Describes in detail these and many other designs — including edge-clamps, miter-clamps, press screws, welders' clamps, machinists' clamps, piling clamps, etc.

Sold Thru Leading Distributors

ADJUSTABLE CLAMP CO.

418 N. Ashland Ave., Chicago 22, Ill.

SPECIALISTS in the manufacture of CLAMPS for nearly 60 years.

NOW DIRECT LABOR SAVINGS CAN

BUY YOUR FINISHING DEPARTMENT

A DeBURGH CONVEYOR

IT'S A FACT! The reduction (up to 50% and more) of finishing room labor actually pays for a DeBurgh conveyorized finishing system in less than 18 months, then pays a like amount into your net profit column throughout the years. This — plus better quality control, resulting in a finer finish — makes the DeBurgh conveyor a self-amortizing investment of the highest order. Perhaps most important is that for the very first time in wood finishing, an accurate cost and production control tool is yours.

TERMS AVAILABLE

In the past, the custom-built features of an individualized conveyor system have always been a deterrent to financing. Now we are pleased to announce the availability of terms which will enable a furniture manufacturer to utilize his labor savings to make monthly payments — and still leave an increased net profit margin. Write for profit Booklet JG!

"DESIGNED BY A FURNITURE MAN FOR FURNITURE MEN"

DeBURGH CONVEYORIZED FINISHING SYSTEMS

10 So. Eleventh Ave. Evansville 4, Indiana

New Airless Paint Spray System

The Spee-Flo Company, 6614 Harrisburg Blvd., Houston, Tex., is introducing the Chieftain hydra-airless, a completely new and portable airless spray paint system based on hydraulic atomization. The manufacturer says the unit helps eliminate overspray resulting in material savings of up to 40%, and permitting work in open areas without the use of a conventional spray both.

The hydra-airless system, based on mechanical atomization, requires that viscosity-controlled paints be forced through a specially designed orifice at high pressure. Desired atomization is achieved through control of viscosity, orifice and pressure. No atomizing air is used.

Completely self-contained, the unit combines the explosion-proof Spee-Flo heater and divorced action pump in a mobile unit which carries the original five or ten gallon container. The unit is capable of operating one gun on hose line up to 75' long, or two guns simultaneously on hose lines up to 50' long.

Use postpaid card. Circle No. 1

Lilly Dye-Seal

This new product is said to be usable in place of bleaching, neutralizing, or N.G.R. staining. The Lilly Varnish Company states that many finishes which previously required bleaching may now be finished with Dye-Seal.

Lilly Dye-Seal finishes improve the appearance of the finish because the wood grain has not been affected, says the manufacturer. A 6% washcoat is recommended over the Dye-Seal which contains 15% solids. On this foundation, wiping stains, fillers, glazes, etc., will give good color uniformity.

Complete information is available from the Lilly Varnish Co., 666 S. California St., Indianapolis, Ind.

Use postpaid card. Circle No. 2

Conveyors

Complete details on applications of Bush-Lock Universal overhead trolley cable conveyors are offered in a new 4-page bulletin published by the E. W. Buschman Co., Cincinnati, Ohio. Bulletin No. 40A describes the comprehensive Buschman selection of standard stock components available with the conveyor. These include trolleys, tracks, drives, turns, idlers, gap sheaves, curves, quick-dip units, etc. All are illustrated individually for closer inspection, as well as in sample functional layouts.

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finishing section

- More than 85% of all finishes used are applied by spray. What are the origins of spray painting? Can all materials be sprayed? Frank R. Pitt, secretary of the National Spray Painting and Finishing Equipment Association has contributed the article, "We Live In A Spray Painted World." He records the phenomenal progress made and offers some suggestions as to future developments.

- Do new developments challenge you? Do they cause concern that new methods or materials will be too expensive; that your competitors may find ways of getting ahead that are not available to you? E. A. Zahn says, on page ——, "The most disturbing thing of all in finishes application development is the knowledge that something is new."

- One of the outstanding developments during recent years is the definite move of the users of finishing materials to want to know more about the products they use. Telling your supplier your problems and keeping informed about his new products provides a good way for you to be sure that your methods and materials are the best for your operation.

- Here are just a few of the more recent developments in application: Airless spray—a method that requires only half as much exhaust air as in convention spraying and decreases heat loss and dirt problems. Hot spray—not new, but a method that continues in popularity. This method enables a material to be sprayed at the same viscosity all year. Steam spray is a process which uses super-heated steam to replace compressed air for atomization.

- In the field of application methods, some manufacturers have exploited a technique for scraping, or knifing, the final coats of lacquer instead of conventional rubbing. This method of final treatment provides very pronounced clarity, smoothness, build and appearance that is comparable to many custom and hand-finished pieces of furniture. This is known as a burnished finish.

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New Developments Present Challenge

By E. A. Zahn
Industrial Finishes Consultant

▼ The most disturbing thing of all, in finishes application development, is the knowledge that it is new. Most of the time, the developments which impress us as being brand new, are in reality, reworked old ideas. As a matter of fact, everything that has been offered to us as new methods, since the spray gun in 1923, are redressed old ideas. Let's face it. The spray gun itself at that time was only an overgrown perfume atomizer with compressed air attached to it.

Spray Gun Feared by Hand Finishers

A great many people hesitated to adopt the spray gun for wood finishing because the learned hand finisher was then a prize package who warned that the spray gun couldn't push the paint into the wood like a paint brush could. To-day, of course, only a very few hand finishers can be found and they are trying to copy the old, not the new, in some remote antique shops. Yet many of us can still remember the criticisms that they had for the spray gun.

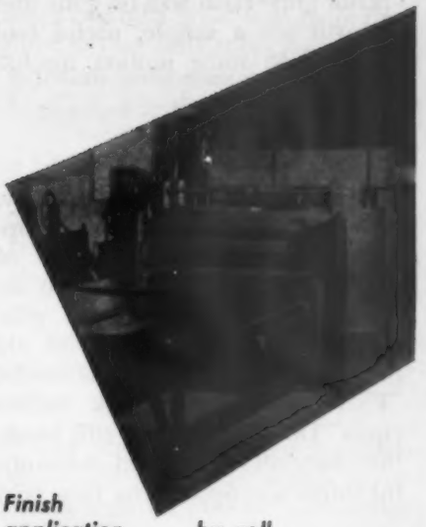
There have been many supplemental developments to further promote the use of the spray gun. Some of these were necessary and quite beneficial while others merely kept up the interest by posing as new discoveries. The gun was made automatic in motion in many ways. Liquid pumping and recirculating systems were developed which were of considerable value and saved many man-hours. Better air cap, fluid tip, and fluid needle combinations were developed until a hand finished surface could no longer compete with the machine finished surface appearance produced by the spray gun.

Electrostatic came along but of necessity, was mostly confined to metal finishing for obvious reasons and yet, electrostatic itself was not originally developed for painting. It was merely adapted to painting from other developed uses.

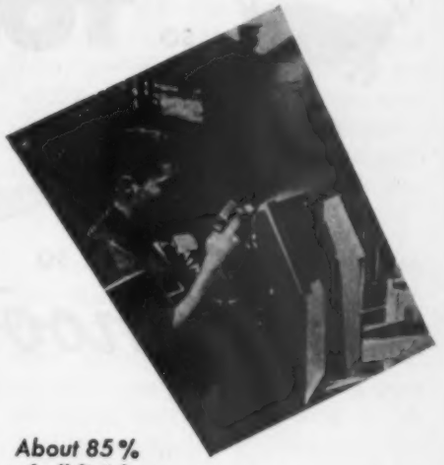
Can We Spray Without Air?

The airless spray gun, the paint heaters, compressed air heaters, and even the catalyst mixing guns came along, not really as new developments in that sense, but more as instruments designed to keep the spray gun in the picture and to combat its natural shortcomings. That short-coming of course, in wood and metal finishing alike, was the waste factor of practically half of all of the purchased good finishing materials and solvents.

When an attachment or a revision can be made which will result in high utilization, the spray gun will become permanent both as an automatic and a hand operated tool. It will not look like a spray



Finish application by roll coating flat surfaces.



About 85% of all finishes are applied by spraying.

Dipping offers advantages and disadvantages.

Pressure curtain application is new method.

gun as we know it today. The "pistol grip" flash will be gone and we will see a simple, useful tool attached to some motion mechanism.

Is Flow Coating New?

Flow coating too, to many, sounds like a gigantic new development which is nothing short of frightening. Yet, flow coating is actually older than the spray gun. It is merely another revived old painting method. When the model "T" Fords and the black "baked japan" Dodge cars were still black, they were all flow coated. A beautiful finish was applied by flow coat then on completely assembled, closed and open car bodies up to the early twenties. This then promising process was forced into oblivion by the nitrocellulose lacquers which could only be applied by spray. When the flow coat process was being revived—since 1935—many minor process improvements were made. But not until the past two years, has flow coating undergone any real scientific improvement. Now, of course, this process is about to come into its own through real process advancement.

Disturbed by Dipping?

Dipping, isn't in reality any older or younger than flow coating but it is in more prominent variety use. This is because the many variables of the process are relatively simple and more easily understood. Conveyorized dipping is disturbing to some due to the large tank capacities necessary and also because of the large production volume required to justify it as an installation.

Plunge dipping, which will accommodate lower volume tanks and low production volume is also frightening to some merely because it is not too thoroughly understood. Plunge dipping, with an after-vapor tunnel can be exactly like and produce results like flow coating. The important difference between the two is that in the one case the parts are given to the paint and in the other case the paint is given to the parts.

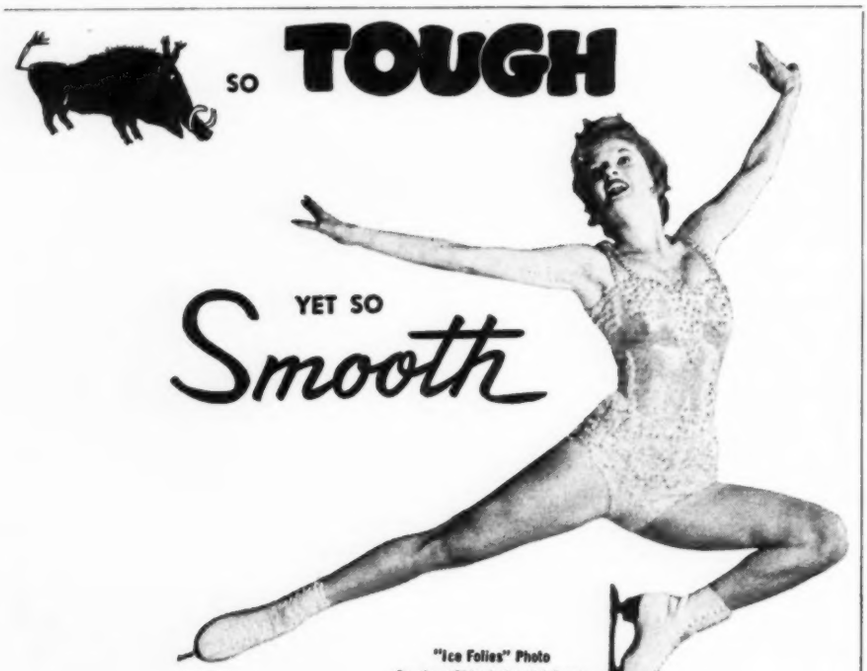
Slow withdrawal dipping has confused many prospective users, mostly from misunderstanding. This method of painting is ideal for large volumes of fairly small parts and is more popular in the metal finishing field. There are three simple types of slow withdrawal dipping adaptable where part buoyancy is not a problem.

A. The preloaded work racks can be lowered, to the desired depth and withdrawn, hydraulically, at any predetermined rate from ¼" to 5" per minute.

B. The loaded rack can be lowered into a stationary empty tank. The paint is merely pumped in from an auxiliary tank and allowed to flow back again at any predetermined rate.

C. The filled paint tank can be raised to immerse the parts suspended from a stationary rack. The tank is then hydraulically lowered at a controlled rate.

Slow withdawal dip painting is a 100% utilization process capable of producing perfect finishes, clear or color, with any material type. There is certainly nothing frightening about this method when it is understood. It can also be used to apply color trim on many parts. There are probably more homemade, slow withdrawal dip systems in use than there are purchased ones.



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Pouring Head Offers New Challenge

One of the newer challenges for the wood finisher is the "pouring head" method of coating. It now exists, to some extent, in the U.S. in three different forms. Two types are imported varieties and one is in a domestic form. Frightening or not, it is a very sensible method of painting, for certain products, and results in 100% paint utilization and full automation. It is a very high speed operation and will accommodate flat surfaces as well as surfaces with considerable contour.

There are numerous built-in applicable controls available with the pouring head process. The small quantity of paint involved in process, is recirculating and can be under constant filtration. The paint temperature and the viscosity, one relying on the other, can also be accurately controlled. The distance of the pouring head from the work and the delivery pressure in the pouring head are both easily regulated. The pouring head orifice opening is equipped with a simple adjustment. For a final accommodating and safety adjustment, the feed and the take-off belts can easily be speed regulated. *Heavy or light perfect films can be applied to completely flat and mildly contoured or grooved surfaces but right angle edges cannot be coated.* A workable variety of high production volume is necessary. One of the outstanding features of these machines is that a work variety from 1"-50" wide can be processed without paint loss. The resulting finish is entirely free of process texture marks with near perfection and cannot be duplicated by any other process.

New Developments Should Present Challenge—Not Concern

In the wood and compound finishing trades, there are numerous large flat surfaces to be treated which can be accommodated by the "roller coating" method. This method is already in popular use in both the wood and the metal trades. Again here, the roller coating process appears to have frightened many who have not kept up with the new developments in that field.

Roller coating, while originally developed for continuous coating on sheet metal strips, exists in at least three entirely different forms which are applicable to wood and compound flat surface finishing. These are (a) simple roller coating, (b) reverse roller coating, and (c) print roller coating. Pieces as short as 12", in any width can be finish processed with available or specially designed equipment. There are positive acting machines with previous use experience and can be demonstrated by the manufacturers prior to equipment sale.

A well recognized problem in the wood and compound finishing trades is the curing of non-lacquer synthetics. Wood and compound has natural heat limitations due to the contained gasses and somewhat due to the contained moisture. These gasses are driven out when heated. If the film begins to form before all of the gasses have been driven off, blisters will result.

The synthetics are fast becoming the perferred finishes on wood, in much of the industry, provided of course that they can be conveniently and quickly cured. There is considerable activity now in the area of catalyzed synthetic wood finishes. The fright factor in this instance is based to a great extent on the relatively short pot-life of the pre-mixed cataylsts and or accelerators. This is definitely a false and unjustified concern as there is no intention to premix the catalysts and accelerators prior to use.

If spraying is to be the application method used, spray guns are available (and in use) which can meter the proper amount of catalyst into the atomized synthetic, outside of the spray gun air cap. There just is no pot-life problem in such cases! Some of the catalyzed synthetics on wood products have demonstrated an entirely new and more attractive finish than was ever considered possible. They can have an appearance similar to a clear plastic laminate on wood, but can be applied to contours as well as to flat surfaces. Catalyst cured finishes can be a great deal more durable, in mar-resistance, alcohol and moisture resistance, and can be as burn-proof as the plastic laminates.

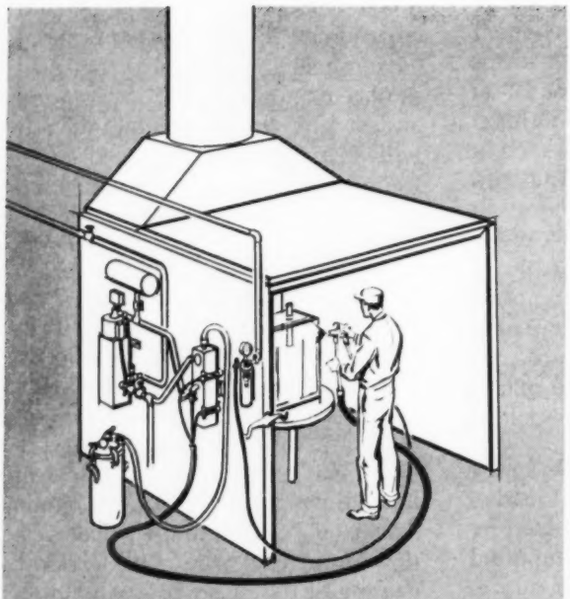
Catalyst coating development and related application equipment development is probably the most important new step in better wood and compound finishing to-day. It will soon appear more and more frequently until it is highly competitive to the conventional coatings.

The users of finishing materials should be urged to equip themselves with all possible knowledge of this development in order to remove or prevent the fright factor before it takes over again. It appears that our misunderstanding of new developments is our main source of fear. Actually, most new developments, when understood, are really based on process simplicity with product improvement possibilities.

One good example of a desperate, but fearless user comes to mind. A very progressive ruler and yardstick manufacturer who had tired of petty competitors and their ever changing petty propaganda in his highly competitive business decided that he would stop it all by modernization. He decided that propaganda was not the right road to progressive business growth.

He had been operating a large, but so-called, one man controlled business and wisely entrusted his problems to specialized outside help. As a result, he purchased newly designed automatic coating equipment and conveyors capable of three times his previous production, at lower cost, but with improved uniform finishes. All of this required considerable courage, but it did pay off. Of course there were problems and it took time to get all of the bugs out, but he can now honestly claim a superior product with much greater uniformity. He typifies that industrial management which is most likely to continue to succeed while his competitors are still trying to find the proper propaganda to offset his success.

How DeVilbiss Hot



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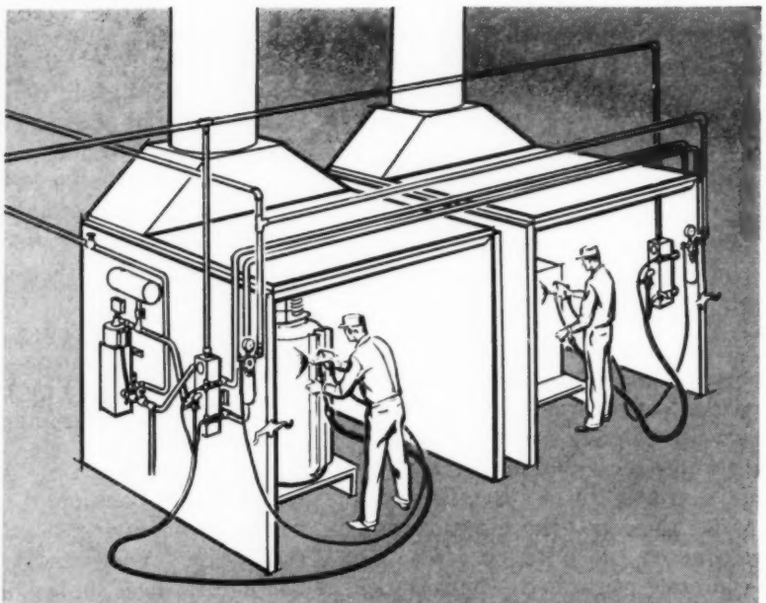

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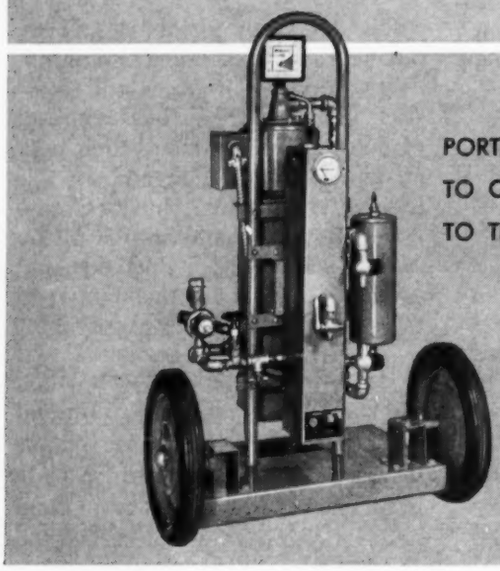

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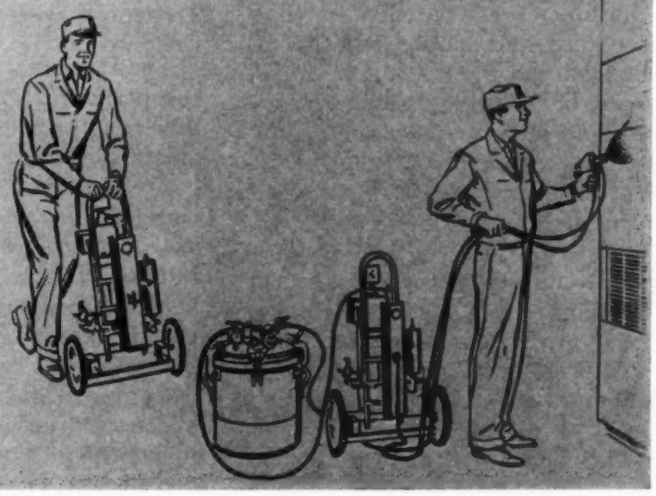

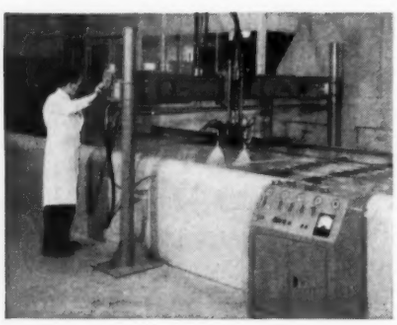

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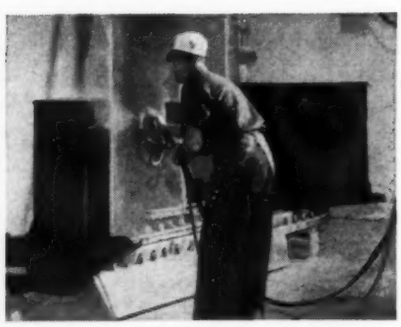

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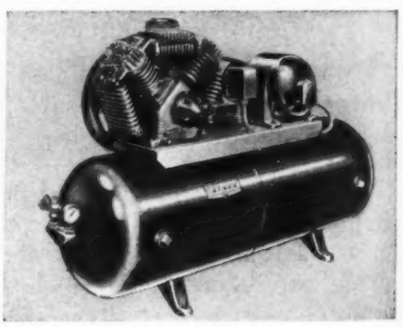

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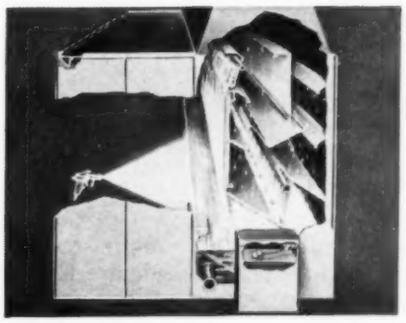

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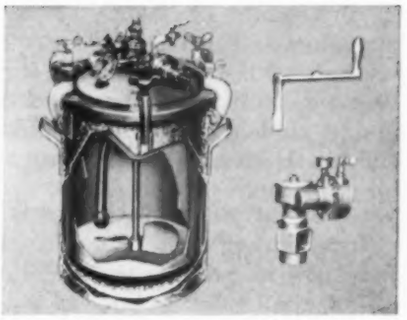


DeVilbiss Paint Tanks. Hand or motor-driven agitation for heavy materials. Galvanized. Simple! Foolproof! *Send for Catalog IE-E*

We Live in a SPRAY-PAINTED WORLD!

By Frank R. Pitt, *Secretary*
National Spray Painting and Finishing Equipment Association

▼ When you look around you—at the furnishings in your home or office, in stores—or when you examine the automobiles, trains and planes in which you ride, you see industrial finishes—85-90% of which are spray applied.

Origins of Spray Painting

The origin of the technique of spraying is a matter of speculation. There is some belief that early man discovered that a broken river reed, when blown through, would mix air and water and produce a spray. It is known from a study of the 10,000-20,000-year-old cave paintings in the Lascaux, France, area that the primitive artists achieved their effects by blowing smoke and colored pigments through a hollow bone.

The painting of the World's Fair buildings in Chicago in 1893 is commonly accepted as the birth of spray painting in the U.S. The advent of nitrocellulose lacquers in the first and second decades of the 20th Century gave the spray method its greatest impetus, and established the spray gun as the preferred method of applying finishes.

Improvements in spray techniques and equipment today permit the master craftsman working with wood to achieve results which surpass the finest efforts of our ancestors. Wood, still one of the world's finest materials for many uses, has a special niche in the hearts of many for its warm richness of appearance. Where the fine quality of finish was once due to the painstaking, time-consuming effort of hand application, the broad choice of both clear and pigmented materials available today permits spray finishes neither conceived nor achieved before.

Can All Materials Be Sprayed?

It is interesting to note that in the several steps necessary to prepare wooden furniture for finishing all of the materials are sprayed. First the bleach or stain is sprayed, and then the successive applications of washcoat, filler, sealer, glazing or shading stains and clear finish coats, where transparent finishes are desired. When pigmented materials are used, the filler is first applied (where necessary), followed by the sealer, undercoat and finish coats, all applied by spray.

Advanced work is now being done with the new catalyst type finishes which may permit their direct application without the necessity of applying any undercoats.

It is no wonder that virtually all furniture is now finished by the spray method, since the quality of the finish is one of the most important considerations in the sale of the article. In fact, probably the longest finishing line in existence, extending more than 3565′ with its multiple stations and ovens, is found in the furniture industry.

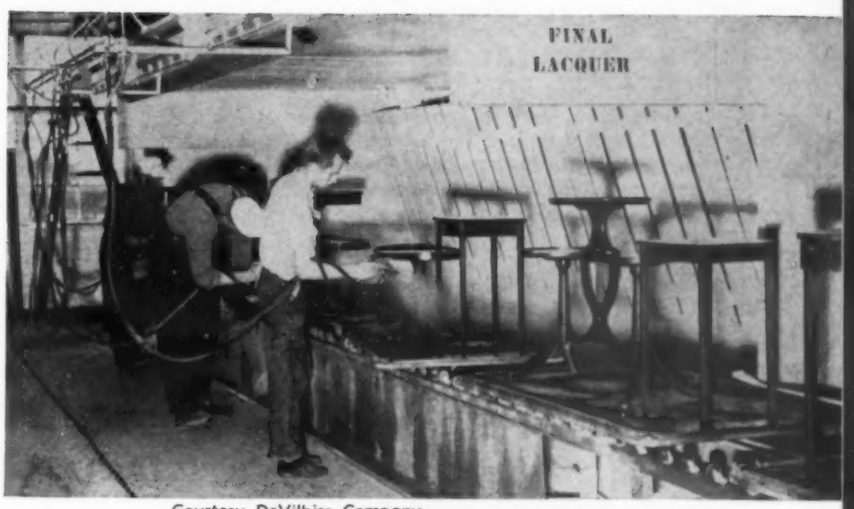
Spray painting equipment has largely succeeded the older methods of paint application because of its ease and speed of application. The more rapid drying of present day finishes permits the necessary successive steps to be performed with a minimum interval between each operation. Actually, certain finishes such as most lacquers and multicolored materials can only be sprayed.

Where Can Automatic Spray Guns Be Used?

Just as the use of the hand spray gun increased efficiency of the industrial finishing room as much as 1000% over the old brush method so, too, the more widespread use of automatic spray guns for certain types of painting has increased the efficiency of the worker in such industries by as much as 400%. For example, office partitions of standard size are now regularly painted with automatic equipment at the rate of 120 square feet per minute.

Similarly, in the railroad equipment industry, box cars are automatically painted by means of transverse gang sprays which are installed in an automatic traveling spray booth that passes over and along the cars at the rate of 15 f.p.m. or one car every 6-7 minutes. It takes only 3-4 minutes to paint the tops and sides automatically, and three minutes to paint the ends of the cars manually.

The development of efficient controlled temperature-low pressure (formerly, known as the hot spray



Courtesy DeVilbiss Company

For spraying products with less area, such as these small tables, hand spraying is most practical method.

method) equipment has further contributed to the speed and efficiency with which finishing operations are conducted and has also greatly improved the quality of finishes by enabling a full wet coat to be applied, which results in better adhesion, good flow out, and higher gloss. Through the use of such equipment, blushing is eliminated, a heavier film build is achieved, and this in turn, results in a reduction in the number of coats that must be applied. Further economies result from the saving of material and lower maintenance charges.

Applying heat to materials reduces the viscosity, enabling the use of lower air pressures, which in turn results in more uniform and finer finishes. It also eliminates difficulties arising from temperature changes.

Better Exhaust Equipment Aids Finishing Developments

In recording the phenomenal progress which has been made in the field of industrial finishing, due acknowledgment must be given to the manufacturers of the exhaust equipment that is an indispensable part of any finishing room and permits finishing operations to be conducted in safe surroundings. It is axiomatic that overspray and flammable vapors be removed from the production line, and the worker provided with a constant supply of fresh air, heated during the winter to a reasonable temperature.

Paint and other finishes in the larger plants are now delivered to the spray stations in closed pipe circulating systems to eliminate the danger of fire or explosion when trucking large quantities of material from the mixing to the finishing room.

Although spray painting originally employed compressed air to apply a finish, today the industry also uses airless methods of application. The advantages claimed for airless painting are less overspray, which results in an economy of material and solvents and lower maintenance charges.

Courtesy DeVilbiss Company

Three DeVilbiss automatic spray machines apply a second coat of lacquer to television cabinets as they travel through the spray area. The machines, one spraying horizontally and two spraying vertically (see arrows), are located in a DeVilbiss pressurized, down-draft, dry type spray booth.

Is Further Automation Necessary?

As we look forward into the future, it is safe to predict that further economies will be achieved in industrial finishing through the more widespread use of automatic, semi-automatic and hand methods of application. Also, constantly improved materials being produced by the paint industry will result in heavier film builds using either controlled temperatures or normal cold spray, which will in turn give further economies in application.

It is certain that more durable finishes such as the new group of catalyzed materials of the epoxy, polyester and iso-cyanate families will furnish films more resistant to corrosion and chemical fumes and vapors, and will impart insulation and other properties, all of which were unheard of only a few short years ago. To handle these new finishes, improved spray equipment is now available where required.

Only by increasing the efficiency and productivity of our American workers can our great industrial complex continue to compete successfully with the lower paid workmen in the other countries of the world while paying the highest wages that history has ever recorded.

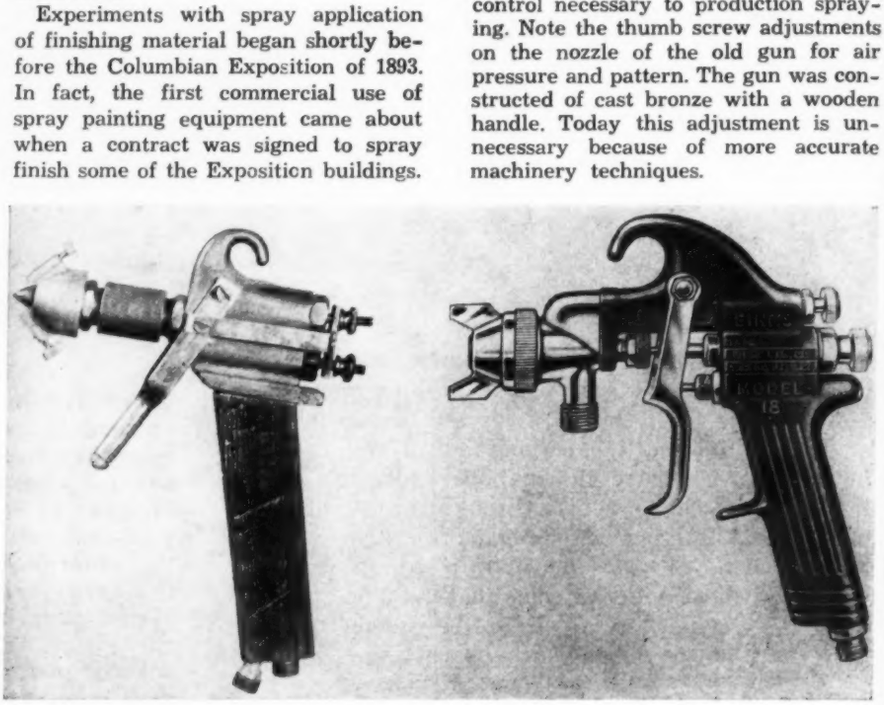
Development of Spray Gun for Finishing

Long, arduous years of experimentation, trial and error are represented in these pictures of a 60-year span in spray finishing equipment. Visual comparison between the old and the new tells a capsule story of the growth of the American spray painting industry.

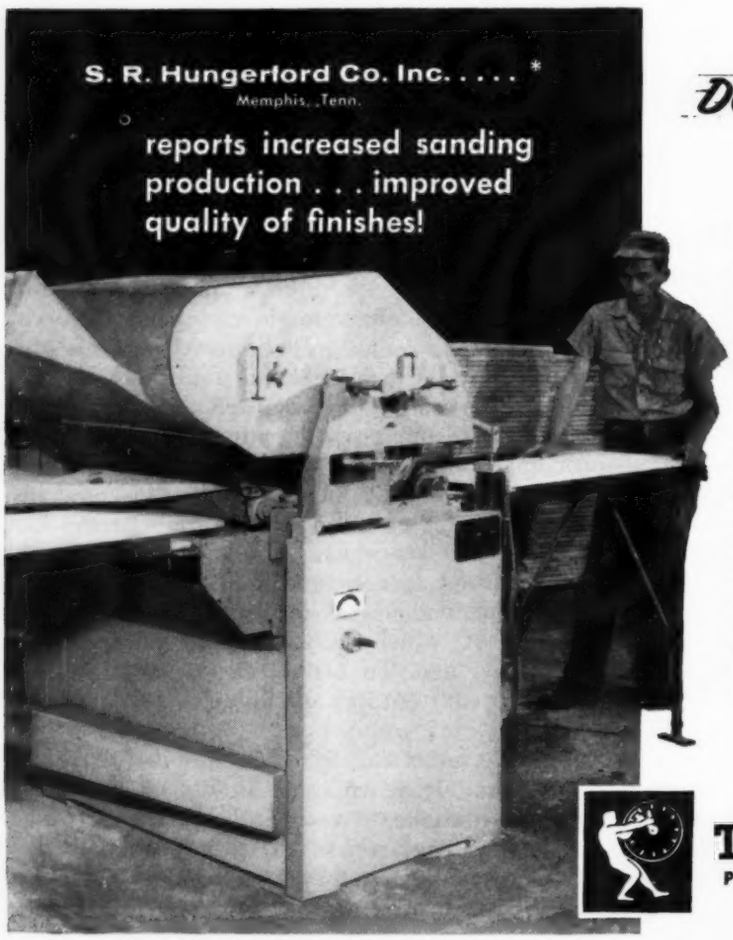
Crude though the first spray gun may look, in its day it was a tremendous stride forward in the application of fine finishes and lacquers. Joseph Binks, founder of the Binks Spray Equipment Company which later became the Binks Manufacturing Company, Chicago, was one of the pioneers in the development of the spray gun and many attendant developments in the finishing equipment field.

Experiments with spray application of finishing material began shortly before the Columbian Exposition of 1893. In fact, the first commercial use of spray painting equipment came about when a contract was signed to spray finish some of the Exposition buildings. Further experiments led to the development of the external mix nozzle.

Prior to the development of the external mix nozzle, it had been impossible to get the kind of air and material control necessary to production spraying. Note the thumb screw adjustments on the nozzle of the old gun for air pressure and pattern. The gun was constructed of cast bronze with a wooden handle. Today this adjustment is unnecessary because of more accurate machinery techniques.



Two models of Binks spray guns. Gun on left is from 1909. Note the wooden handle with thumb screw adjustments. On right is the current model 18.



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DUAL ACTION SPEEDBELT T.M.

SANDER

* Mr. Frank Hungerford, Works Manager of the S. R. Hungerford Company reports as follows: "If ever a machine has been properly named, this one is. With the increased work load in our sanding department it would have been utterly impossible to get results and meet production schedules without the aid of our TIMESAVER Sander. Another important factor is the quality and uniformity of the work done by the TIMESAVER "Speedbelt", such as rough, scratch and finish sanding."

The S. R. Hungerford Co. has a Timesaver TOP-24 "Dual Action Speedbelt" Sander with a polishing platen. This engineering innovation by Timesavers makes it possible for them to achieve a long scratch pattern over the entire width of the panel in a one-pass operation. Running solid maple, cherry and walnut panels for use as dresser tops, drawer fronts, etc. they obtain extremely fine results.

This installation is typical of hundreds throughout the country. Users everywhere report savings in labor, time and materials while obtaining consistently better quality in the finished product.

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Pioneers of wide belt sanding for the woodworking industry

Chest of drawers illustrates sharp contrast between the original, dark brown mahogany finish and the modern, bright looking transparent finish. Chest was obtained from local stock. One half was stripped and refinished in Grand Rapids Varnish Company's finishing studio.

WHAT MAKES A MODERN FINISH?

By Darrell Ward, *Field Editor*

An Interview With
W. E. Martin
Technical Service Department
Grand Rapids Varnish Co.

Furniture has never been a product of the highly mechanized methods used for appliances and automobiles, although many mechanized improvements have been made in recent years on the woodworker's production line.

A well known furniture manufacturer pointed up a significant difference between high quality furniture and other kinds of merchandise when he said, "We don't put our name plates on the front of a cabinet or drawer like the refrigerator, appliances and automobile manufacturers do. A housewife may boast that she drives a Chrysler; keeps food in a Hot Point refrigerator and does the family laundry in a Whirlpool machine.

"But her hat, her coat, and her furniture must be meticulously selected to please her in a very personal way. A woman will prize a good brand name in furniture and brag about it—if it proves she has good taste. But a good brand name is not enough: the piece or pieces must suit style, appearance, function, etc."

In explaining the difference between furniture and other items in industry, this furniture man made it clear that furniture is a style item and necessarily must reflect individual craftsmanship designed in the original conception. And, this applies to a great extent right down to the lowest priced, mass produced promotional goods, however indirectly it may seem to relate to the construction or durability of cheaper merchandise.

"Further," he said, "furniture styles cannot be positively set two years in advance as is done with automobiles. Therefore, furniture plants can never tool up for mass production in the same way as the Detroit production lines. Besides that, finishes vary widely even when there is no problem in basic construction."

►*THEN HOW DOES A FINISH MANUFACTURER TRY TO COPE WITH PROBLEMS ON THE FURNITURE PRODUCTION LINE?*

Mr. W. E. Martin, Technical Service Department, Grand Rapids Varnish, said this question could not be answered briefly. GR Varnish not only

Materials are thoroughly tested in raw material control lab prior to use in plant. Routine tests are made on all materials regardless of supply source.

Experimental color grinding is equivalent to plant miniature. Colors are formulated in small lots on all special development work to establish formulas before production runs are made.

Hundreds of special formulas are developed, blended, and stored for reference on these shelves.

supplies complete finishes, with every item used between white goods clean up and the packing line, but goes deeply into specific problems which require all phases of research, development, and styling of tailor-made finishes for the furniture.

"When it comes to developing new materials or methods, there are two attitudes we find among customers," Mr. Martin said. "In going from one extreme to another, we may find one manufacturer who won't let you touch a thing on his line until you come up with just the right finish, fully perfected to suit his requirements. The idea is, don't do anything experimental with my line."

The opposite extreme, of course, is the customer who is ready to co-operate to the fullest extent and permit all kinds of experimental work right on the production line if it will help solve his problems.

There are fewer and fewer of the first type, according to Mr. Martin. And, the second type is not exactly typical. Yet, there are more people coming around to that general direction in varying degrees among the enlightened manufacturers.

To be practical, some experimental work must be done, at least in small batches, directly on the production line if all the problems are to be worked out. No matter how much work is done in the lab or in the finishing studio, practical problems occur on the line when they would never show up under other conditions. They may relate to working techniques, spray equipment, ovens, conveyors, or hundreds of unforeseen factors.

Mr. Martin sympathizes with the customer's side of the question in realizing that some work will be spoiled in experimental runs. This can be costly on a high production schedule, either in time consumed or merchandise rejected. At the same time, it is a necessary risk and part of the total investment toward improved finishes or new finishes.

When a customer is not in sympathy with this idea, beneficial improvements in finishes or finishing technique merely for the sake of avoiding any trouble at the moment. A good example is hot spray.

A few years ago, hot spray applications were almost unknown. Today, a recent survey by the Hercules Powder Company, suppliers of basic cellulose products to the finish manufacturers, indicated that 60% of wood furniture lacquers are hot sprayed.

"We had proved hot spray to our satisfaction and to a number of shops about five years ago," Mr. Martin said, "and I was convinced it was a good thing.

"When we got into high production furniture plants, we ran into difficulties. Because of some problems in the heat capacity of the equipment being used at that time, we had to slow down the lines to about 2/3 normal capacity. The results were favorable, but not the customers' reactions. Some of them dismissed hot spray as a failure because it slowed down the line."

A more constructive attitude might have been to realize that larger equipment was required to supply the huge volume of lacquer used at normal speed on the line and the problem would have been solved.

An opposite example was in dealing with a large southern furniture manufacturer who had problems with a new design. The contour of the edges of the pieces seemed to invite excessive wear and nicks. The style, the light color, and type of finishing materials used, all contributed to the problem. Mr. Martin was called in but was reluctant to suggest the practical solution because it would introduce other problems in production.

"A vinyl sealer would help, but you might not want to use it," he told the customer.

"Why not?"

"Because it is thin, does not make a good build, and is very difficult to sand. Its benefits are lost if it is formulated with stearate to give it satisfactory sanding qualities."

"How can it be used?"

"With stearated paper."

"Send some of the stuff down here. We'll try it."

The company had trial runs along with some tribulations in

learning to handle the completely different product. Then, they made comprehensive tests in their own labs. They did not, however, let the sanding problem stop them, even though abrasive supplies and sanding techniques had to be changed from standard practice in that plant. But, the company solved the new design problem and found the line quite profitable, once they eliminated rejects on damaged edges.

Many innovations, radical departures or mere variations to improve a product, often will look good in the finish manufacturer's laboratory, but may cause minor production line problems. Often, to achieve new benefits, the user will have to make some kind of compromise.

"Some customers," Mr. Martin said, "will tell us that if our new product looks good for them we should let them see it. They will determine if it warrants a necessary compromise.

"We will hesitate even to mention new developments that would create production problems in certain other plants because to them, smooth and fast production is the essence of business. They are interested in improved quality only if it will not interfere with quantity.

"Don't misunderstand. There are some good, forward looking people who are doing a real public service in offering good furniture and good styling at a low price to the consumer. It is only fair to credit them for this when one considers that they only can afford to accept a new product after it is perfected and proved on someone else's production line. This is nothing but good, common business sense in their type of production."

► *DO CONVEYORIZED LINES PRESENT SPECIAL PROBLEMS?*

"Conveyor lines move goods very rapidly. We do have problems in getting the higher quality finishes under this condition, but the problems can be overcome. Actually any kind of finish, no matter how involved in the method, can be done on a semi-powered line where pieces stand for the desired length of time at each work station. Fully powered lines which move continuously have forced us to develop much faster drying materials. We now can give the customer materials which will dry fast enough for any operations on his line. Modern finishes can easily be adjusted at any time for automatic spraying. This method, however, does not readily catch on in furniture production of many kinds because of the intricate shapes."

► *HOW MUCH OF A PROBLEM MUST BE PRESENTED BY THE USER BEFORE IT IS PRACTICAL TO SOLVE BY THE FINISH SUPPLIER?*

"We must know all about their problems and exactly what they want," Mr. Martin explained. "What they want is sometimes easier to determine than how they can get it under local conditions. It is typical of the low cost producers to want merchandise to *look like that finish!*"

The trouble with "*that finish*" is that it often is seen on some of the most expensive hand crafted lines in current production. The people who ask for the same kind of finish want to produce it at maximum speed and minimum cost on high production lines.

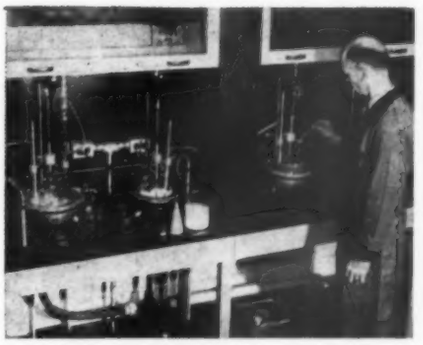
"You'd be surprised at what manufacturers of finishes have been able to do for the low cost producers to make their goods look similar to the more costly finishes," Mr. Martin said. "But it is not always easy.

"Many of the best finishes today are built on bleached wood. There is a wide acceptance, from stylist to consumer, of light colored background with grain pattern emphasized by very dark filler in the pores.

"High quality producers get this finish by bleaching followed with a good washcoat, dark fillers, glazes and color padding. The low quality producer gets a similar appearance by using pigmented toners to lighten the wood background and produce an imitation bleach which will range from transparent to fully opaque.

"This method is less satisfactory than it used to be because the

The physical testing laboratory checks hardness, resistance properties and durability of finishing materials. Specially designed equipment and sensitive instruments provide answers to every question which can be asked. A number of pieces of equipment here were specially built to comply with test requirements of certain customers.



Synthetic resins and varnishes are tailored to special requirements in these experimental cookers.

Experimental mixing of stains for special color work is done in the finishing studio under the direction of Dan Buckle, furniture styling counselor. Buckle keeps abreast of modern trends through his close associates in furniture design, decorating and textile arts.

public is becoming more educated. Consumers are learning to visually compare the differences between the clarity of the good finish and the 'painted look' of the other. The low price producer now asks us for materials to develop a pigmented finish that will look like some of the best bleached wood clear finishes."

► *HOW DO YOU MEET THIS PROBLEM?*

"We tell him he's got to bleach. Then very often the customer will reply, 'We can't possible bleach!'

"Many furniture manufacturers have heard some pretty fantastic stories about bleaching. So, they're afraid of it. Such a customer is letting his prejudices overwhelm him. The fact is, we can supply him with very efficient and simple methods of producing a beautiful finish, but they will involve chemical bleaching of one sort or another. Modern bleaching methods are faster, simpler to apply, and more foolproof than anything known a few years ago."

► *WHAT ABOUT THE TENDENCY FOR BLEACHED WOOD TO CHANGE COLOR?*

"I do not think that is a serious problem. Properly done bleached finishes will give less trouble than some natural wood colors."

► *DOES THIS MEAN THAT EVERYONE IS EXPECTED TO COME AROUND TO BLEACHING IN ORDER TO BUILD A GOOD FINISH?*

"To follow present trends, it does not require drastic bleaching of everything. The darker woods in many cases may need only a little 'brightening up' a shade or two lighter. But, this ties in with the problem to compromises. To get the brilliant, luminescent or translucent look of a good modern finish, a certain amount of bleaching is necessary because pigments just won't do the same kind of job. To get what he asks for, the customer will have to give a little. We naturally try to make his compromise as painless as possible."

► *IS THERE ANY ONE FACTOR WHICH COULD ENABLE THE CUSTOMER TO OVERCOME HIS PERSONAL PROBLEMS AND HELP YOU IN DEVELOPING WHAT HE WANTS?*

"What we need most of all is better communication and an attitude of mutual confidence to overcome most of the problems that get in the way. We always make best progress with people we can handle as good friends. Their desires and our mutual problems often can be hurdled easily enough after a few informal discussions in person.

"It is, perhaps, our basic problem more than theirs to get a close, human working relationship. We cannot overstate our claims in selling. We must be cautious and let the customer know the true facts, even if they are uncomfortable for us to face. Customers then trust us once they realize we are not trying to put something over. The chance just to sit down and talk about the problem is the thing. It is the opposite of high pressure selling."

► *WHO ACTUALLY SETS A STYLE TREND IN FINISHES?*

This is really not my department, but the stylists say that color trends start in fabrics, then get picked up in carpeting and draperies. Furniture color styling probably comes at the end of the line and is often derived from the designer's or artist's feeling for it. Beauty in furniture comes from three major factors, other than basic quality of materials and workmanship. They

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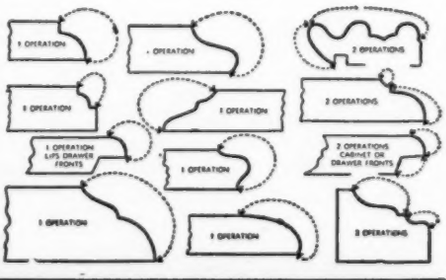

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IW-6

are design, wood selection, and finish."

► *HOW DO YOU FOLLOW TRENDS?*

"We have a research artist who closely follows the trends in better stores and at the markets. He studies mostly the higher class merchandise, asks a lot of questions of merchandising people and consumers, and keeps close personal contact with designer friends of his who work in various fabrics and color styling. From all this information, which he gleans on trips around the country three or four times a year, he comes back with his mind pretty well made up about what is good and what will sell."

► *HOW DO YOU SELL A MODERN FINISH TO THE FURNITURE MANUFACTURER?*

"We sell on the basis of final appearance and what will make the furniture sell. We find that some of the lower price producers, who are trying to cut costs on every operation down the line, are not cutting corners on finishes. They will be our best customers when we offer them a finish they want. They will not compromise appearance for minor savings in cost."

► *THEN, DO YOU SET THE STYLE TREND?*

Neither we nor the manufacturer are actually setting the style as such. We are not style creators, but style analysts. We help the customer find his way into what is best for his own market."

► *CAN YOU GIVE US YOUR OBSERVATIONS ON TRENDS MODERN FINISHES?*

"I believe that water base materials will grow as undercoatings. Latex or emulsion types of all kinds of coatings are rapidly increasing in interest. Here are some of the reasons: water is cheap as a thinner; there are no fire hazards; it eliminates fume and odor problems and sometimes offers better sprayability because of its viscosity.

"There is experimental work being done on this line, and some production use. Some manufacturers find the advantages of water base materials so great that they are ready to push ahead. Others have not been bothered much by problems with standard materials and they want to go easy with these newer developments.

"There is another trend toward butyrate lacquers to replace nitrocellulose for the very light color finishes. Butyrate has better color retention properties.

Great interest is also shown in polyester top coatings which have been used for a couple of years in foreign production. This type material produces remarkable resistance properties similar to plastic film laminates. It is a welcome thought that fine quality, luminous modern finishes can be developed on wood with a surface as resistant as synthetic imitations. I believe that polyesters will offer the advantages of phenolics, but without the disadvantages of discoloration.

"The current trend in color is away from the stark, light toned finishes. It is moving toward darker finishes. These are built up with light backgrounds contrasted by dark fillers in the pores to emphasize grain pattern, and often with strong overtoning color. This really makes the grain pop right out with a three-dimensional appearance. It cannot be imitated in painted finishes or in synthetic laminates. It is something that woodworkers can promote as eye appeal not easily obtained except in properly finished natural wood. Muddy browns and dark stains are out, just as much as the flat painted look."

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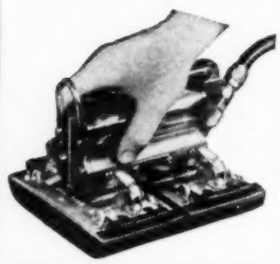
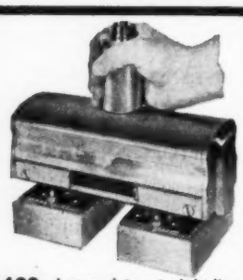
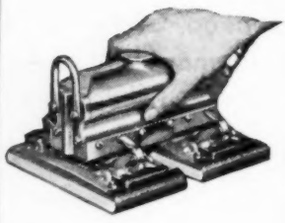


1000—straight-line sander with big abrasive area, operates at 2500 oscillations per minute, palm lever control, 7½ lb.

SP-101—straight-line, single-pad sander, 3000 oscillations per minute, 5 lb.



600—heavy-duty, straight-line unit for sanding, pumice rubbing, or polishing, 1100 oscillations per minute.



4000—straight-line, two-pad sander with longer, slower stroke, 2100 oscillations per minute, 9 lb.

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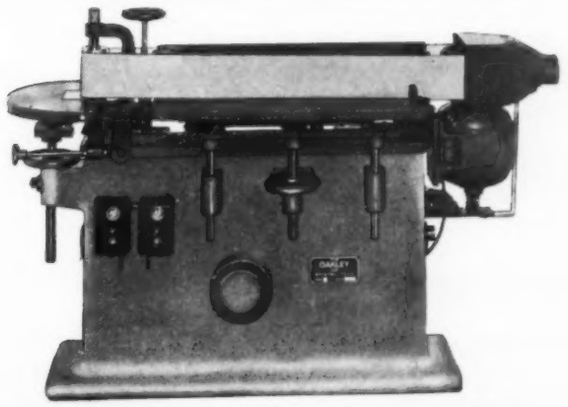

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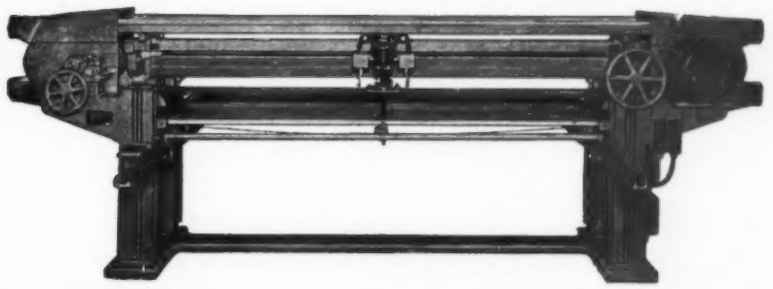

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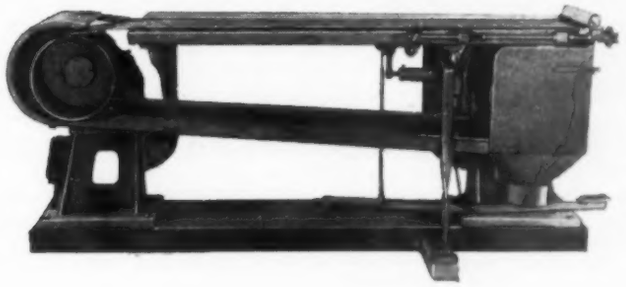

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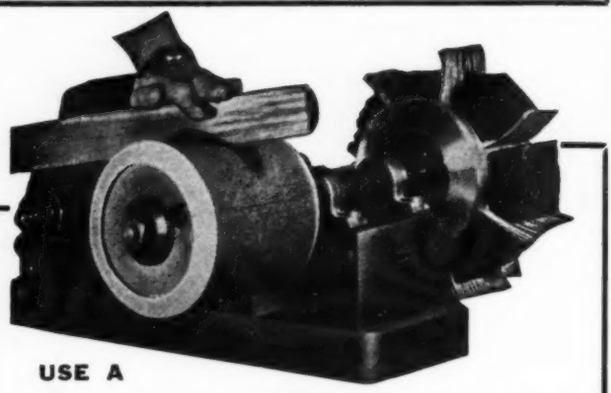

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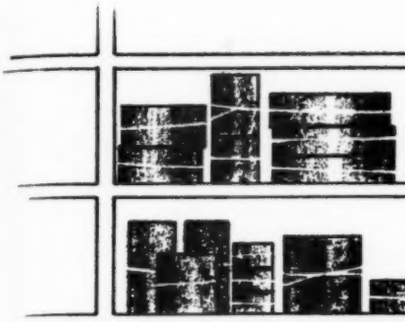

The Outlook for COATED ABRASIVES

Reported by two well-known authorities:
Norman C. Franz, wood technologist, and Kurt G. Sense, product engineer.

Some of the most critical operations in the wood industry involve the use of coated abrasives. Clearly, any new developments in the materials and methods used would put wood industries in an improved competitive position.

More intensive research by the coated abrasive manufacturers should yield substantially improved products. In spite of our currently limited knowledge of the fundamental principles of machining wood with coated abrasives, a number of promising areas for development are apparent.

Engineered Grit Sizes Are Possibility

It is generally recognized that today's grit particles are at best essentially random in shape and orientation. This produces rapid changes in cutting capacity and surface quality, and yields a product with only a fraction of the performance that may be obtainable. Future products may consist of carefully engineered grits, perhaps made of ceramic or similar materials, which will be of uniform scientifically determined shape. These might be oriented and dispersed to produce many true cutting edges which will produce uniformly good surface quality with minimum cost and effort.

Loading of coated abrasives is currently a frequent problem, and is largely a function of the material being machined, product design, and the heat developed by relatively great pressures and speeds. While improvements in grits will help this situation, additional benefits may be realized through the use of lubricants incorporated in the abrasive product and coolants introduced during machining.

A number of problems presently associated with coated abrasives may be traced to the adhesives and backings being used. Improved adhesives for the make and size coats should lead to products which can be stored with less deterioration due to temperature

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and humidity changes. Lessened sensitivity to heat and moisture may substantially improve the performance of coated abrasives. Improved techniques for applying adhesives might be expected to result in faster, cleaner cutting and less loading.

Improved backings, perhaps using glass or synthetic materials, should reduce breaking and tearing of coated products. Other benefits might include better forming qualities and a complete range of flexibility. Belts engineered to put the backing and adhesive in perfect balance will help eliminate cupping and distortion problems.

Many additional research developments can be foreseen in the manufacture of coated abrasives. However, equally significant advances in machines and methods must appear. Simpler, less costly panel sanding equipment will be sought by particle board and other panel product producers. Greater use of the contact wheel principle with its many inherent advantages seems certain to make drum sanding obsolete for numerous operations. Contact wheels may also replace the platen in some cases, although platen design changes show promise of increasing both the quality and efficiency of final finish machining. In general, the drastic improvements in engineering and machine design that must appear in the wood-using industry may be expected to be conscious in abrasive applications.

Along with technical improvements must come better understanding of the use of coated abrasives and allied products. Intensive information and educational programs will be required to introduce new developments and eliminate the prejudices and erroneous practices.

Slowly, but with increasing momentum, wood machining is changing from an art to a science. Through research and technology all aspects of machining are developing, and in some cases it appears that the use of coated abrasives will be replaced by other machining methods unless suitable competitive advances are made. In this respect, it is encouraging to note that a few of the more progressive coated abrasive manufacturers have already expanded their research and development facilities for the purpose of introducing improved products and methods.

—Norman C. Franz
Associate Professor of Wood Technology
University of Michigan

▼The past 60 years have brought improvements in the construction and performance of sandpaper so basic that woodworking production, required to use abrasives of the 1898 model, would come to a rapid halt. Equally spectacular has been the development of modern machinery which allows the woodworking plant to take fullest advantage of these gains.

How Coated Abrasives Have Been Improved

Chief among the improvements are the electrostatic process of applying abrasive to the backing; the development of electric furnace abrasives (aluminum oxide and silicon carbide) and resin bonds; more accurate control of grain size; open coating; waterproof backings; and production of belts with smooth and virtually fail-proof joints.

Electrostatic deposition of abrasive grain, on which the basic patents are held by E. C. Schacht,

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BELT SANDER
Designed and built to give uninterrupted, trouble-free service, this versatile machine solves a variety of finishing operations — for sanding and finishing wood products; and for products made from aluminum, brass, bronze, stainless steel and plastics. Sturdily built, 42" x 80" table mounted on anti-friction rollers; standard 2 HP, 2 or 3 phase ball-bearing motor.
The Beach Hand Block Belt Sander is already in use by over 1000 leading industrial firms! You will be amazed at the economical, efficient operation . . . the initial low cost!
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TILTING TABLE SAW
SHAPER
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Write today-
for full details on Beach Hand Block Belt Sanders and the complete line of Beach woodworking machinery.

president of Behr-Manning Co., gave woodworking a product far superior to that made by allowing the grains to drop by gravity. It not only made for more consistent coverage, but it also embedded the grains securely in the adhesive bond with their sharp ends outward, in position to do the cleanest and fastest cutting.

Development of resinous bonds gave the finished sheet much more mechanical strength. A sheet or belt so bonded resists heat, shedding and loading much better than does the one bonded with animal glues. In turn, control of bonding permits subtly varied degrees of aggressiveness and speed of cut, affording equally close control of finished surfaces.

Modern woodworking production owes much to the modern machine, with emphasis on the wide-belt sanders. Conceived as an improvement on the slower stroke sander, these machines became almost essential with the introduction of plywood. They save huge sums, and they provide fine finishes. Not far behind in economy and utility are the stroke sanders with hydraulic control, and a whole panoply of edge, scroll, mold, drum and multiple drum sanding machines.

New Product for Aggressive Cutting

To come down to today, there seems no question that resin-over-glue bonding of garnet paper and cloth is the abrasive industry's big contribution to added profits in woodworking. So new that it is still undergoing constant field testing, this product combines the unbeatable sharpness of heat-treated garnet with a bond which gives it more aggressive cutting, resists shedding and withstands heat more ably. This last property, in turn, means that the bond softens less than does glue bond, and thus loads less.

Its added aggressiveness means that it will cut faster than the same grit and backing of aluminum oxide, with reduced operator fatigue. In most cases it will cut cleaner than aluminum oxide, but it may produce a finish with a slightly scratchier appearance. For that reason, many users are going to one grit finer than formerly, with a resultant saving in cost and usually a greater belt life. The combination of sharp cut and resistance to loading means that the "resinized" garnet promises to be the best abrasive yet produced for both hardwoods and soft, resinous woods.

Its availability in open coat on a flexible J-weight backing reflects its usefulness for mold sanding. Because it is made in grit sizes only up to 150, it will be used most commonly for cutting down operations. Whether it will become the ideal drum cover is not yet known; for now, it is made in widths up to 36".

Because a host of variables enter into the determination of the "best" abrasive for any one job, it would be unwise to generalize too broadly. In our opinion, however, garnet bonded with resin-over-glue will certainly out-perform glue-bonded garnet material, dollar for dollar, and may be expected to return like dividends, in many cases, in competition with other abrasives.

—Kurt G. Sense
Product Engineer, Woodworking
Behr-Manning Co.

NASH DRAWER SIDE EDGE SANDER

Sands Edges While Feeding From Moulder!

A Proven Time and Labor Saver!

SPECIFICATIONS

Feed	Moulder Speed
Width Range	Up to 12"
Sanding Belt	120" long
Sanding Belt Speed	Variable 1700-3400 Feet per Minute
Sand Belt Drive Pulley	8" Dia. 4" Face
Control and Tension Pulley	8" Dia. 4" Face
Table	12" x 64"
Standing Pad	Adjustable In & Out
Stock Holddown	Adjustable
Motor	2 HP—1725 RPM 220/440—550 Volts
Length	64"
Width	50"
Height	36" Adjustable 2" up and down
Weight	1100 Lbs.

★ Sands drawer side edge during ejection from tail end of moulder.

★ Moulder feed travels stock over table of No. 61 Sander to sand edge of drawer side.

★ As a portable attachment, caser-mounted, Sander can be moved to moulder then quickly moved away when drawer side edge sanding is completed.

★ ELIMINATES additional operation of sanding edges on another machine.

★ Requires no attention after locating at back of moulder, sanding edges automatically as drawer sides flow across table.

NASH

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SPECIAL FINISHING MACHINES SINCE 1890

A roundup of day to day in-plant problems and how they were handled by management men. Each incident is taken from a true-life grievance which went to arbitration. Names of some principals involved have been changed for obvious reasons. Readers who want the source of any of these cases may write to Hitchcock's WOOD WORKING.

Are senior employees entitled to get "first crack" at available overtime?

What Happened?

Because of a downturn in business, overtime work was getting scarcer. Whenever such assignments came up, Supervisor Masur would parcel out the extra time to employees he felt needed it most. For example, there was John Kline. His wife had recently given birth to twins, which put a heavy load on John's pocketbook. So the supervisor saw to it that John made a few extra dollars when overtime came up.

The union didn't like the way Masur was handling these assignments. "We have a seniority system here, and that means that the oldtimers must get first crack at overtime. Let Kline wait his turn."

"I know the contract inside-out," said Masur. "It doesn't say that overtime has to be parcelled out by seniority."

"It doesn't have to say it," maintained the union. "We have a general seniority clause and it applies to all situations. If you don't go along, we're going to take it up with management."

When the front office supported its foreman, the case went to arbitration. The union admitted that its seniority clause did not mention "overtime" but did include promotion and layoffs. However, the union argued that seniority is to protect a worker against discrimination. Assigning younger men to extra-hour work is just that.

The company saw it another way. Seniority is not an automatic right. It exists only in so far as specified in the union contract.

Was the Company: RIGHT ☐ WRONG ☐

What Arbitrator McSwain Ruled

"It is undisputed that the company has not followed seniority in assigning the work. It is elementary, however, that seniority and seniority rights exist only insofar as they are provided by contract. Even without a 'management prerogative' agreement, management has the right to direct the working force and to assign work except as limited in the contract. The doctrine that seniority and seniority rights exist only by contract is a corollary of the inherent power of management. Grievance denied."

Can an employee be fired for taking time off to attend a religious meeting?"

What Happened?

Jessie Lyle was very devout. She belonged to a small religious group which met once a year in Virginia for special ritual. A month before the scheduled meeting, Mrs. Lyle asked her supervisor for a week's leave of absence, to attend the meeting. After some days' deliberation, the foreman refused the request for leave on the grounds that she had already taken too much time off during the year. She insisted that she would go anyway, and was warned that if she did so, she would be fired.

She took the week off—and was discharged. Her case came to arbitration. She argued:

1. This is discrimination. You can't fire somebody for religious convictions.
2. When you hired me you knew I was religious and would be expected to observe special days.
3. A person shouldn't have to choose between her job and her religious duties.

The company answered this delicate question like this:

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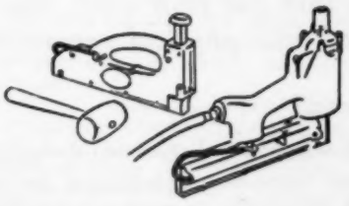
the Faster SPOTNAILS Way!

You can set up a smooth-flowing production line anywhere in your plant with a portable Spotnailer. Drive a heavy-duty fastener ⅜" to 2" long as fast as an inexperienced man can touch the button. No bent nails or pins to back-up the production line. No drilling needed even in hardwoods. Fasteners can be countersunk automatically to a pre-set depth as they are driven. Splitting, denting and gouging of costly wood surfaces is prevented. On many jobs you can triple production by nailing and pinning the faster pushbutton way.

To learn how pushbutton-Spotnailers can increase your profits WRITE FOR a descriptive folder and demonstration.

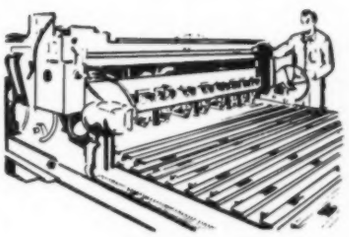


SPOTNAILS, INC.
EVANSTON 1, ILLINOIS

Labor Saving In Desk Manufacturing

Invisible Nailing of Boat deck

Use of Multiple Spotnailers on Millwork



Millwork . . . all jobs

Corner Block Nailing Pinning Chair Rungs and other hardwood dowels

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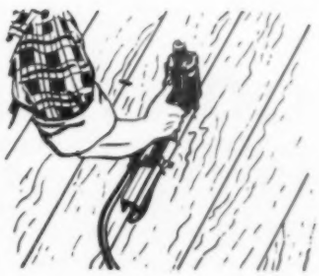

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FIND OUT how HOLTITE Enveloped Screws can simplify your packing problems and save you money. For details, write Continental—Dept. WD.

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HOLTITE FASTENERS
HOLTITE PHILLIPS AND SLOTTED HEAD
WOOD • MACHINE • TAPPING • THREAD FORMING • SEMS • NYLOK
HY-PRO PHILLIPS INSERT BITS AND HOLDERS

1. We can't cater to every religious group, as people would always be taking time off.
2. Leave of absence is not an employee right. It is granted only at management's convenience.
3. We allow certain religious holidays, but cannot agree to let employees take off for religious affairs of their own choosing.

Was the Company: RIGHT ☐ WRONG ☐

What Arbitrator Stark Ruled

"The observance of all religious rites is not an employee's contractual right under the contract. This makes sense. To hold otherwise is to conjure up a constant parade of workers from various religious backgrounds, coming and going to work on this day or that—depending on their religious beliefs.

"Our society, rightly or wrongly, has subordinated religion to the more mundane aspects of life. It requires citizens to conform to certain accepted practices—not at the peril of their lives, but certainly at the peril of narrowing the area of potential employment. If one's religion required one to pray between one and three each afternoon, there are a number of jobs one couldn't hold.

"Discharge does seem rather strong in view of the employee's obviously sincere convictions. Yet, when asked whether she would do the same thing again, if reinstated, Mrs. Lyle answered firmly 'yes.' Under the circumstances, there is no point in ordering her reinstated, only to defy management's decisions once more."

If employees turn out poor work, can you require them to take physical examinations?

What Happened?

Management was very disturbed. A large number of their product were being returned by customers as defective. It seems the inspectors were letting too many bad parts go through for shipment. It required good eyesight to catch the flaws. Faced with the loss of business, the company ordered all inspectors to take eye examinations. All complied except two men. These two men were given a four-day layoff. They protested right up to arbitration, claiming:

1. We were not required to take eye examinations

when we applied for a job, so you cannot make these requirements now.

2. You are creating a new condition of employment, and this cannot be done without negotiating a new clause with the union.

The company countered:

1. We have to protect our business. Eye examination is one way to find out what is causing the poor inspections.
2. No man's job is in jeopardy. If eye examinations call for glasses, we will pay for them. What could be fairer?

Was the Company: RIGHT ☐ WRONG ☐

What Arbitrator McCoy Ruled

"As to the right of the company to institute examinations, no one can doubt that right under certain circumstances. If a man is seen to stumble repeatedly, faint, nearly get killed, nearly cause the death or serious injury of a fellow employee, would anyone contend that the company was living up to its duty to protect the safety of that employee and his fellow employees if it failed to take necessary steps to ascertain his condition and see to its correction? As long as the company adopts reasonable measures, and applies them without discrimination in order to protect the health and safety of the employees, it exercises a proper function of management. If the company has the right, and even the duty to order reasonable physical examinations to protect health and safety, I think it equally has that right, where the facts indicate a need for it, to insure production of a salable product."

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MOST POWERFUL WELDER FOR ITS PRICE

AVAILABLE IN THREE POWERFUL MODELS

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- More time-saving power at this low price.
- Heavy-duty hand gun with NEW non-breakable legs.
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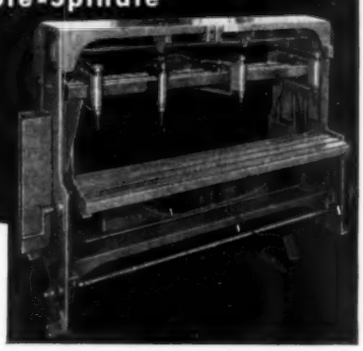

Wonderful new versatility . . . fully automatic operation . . . and the easiest set-up you've ever worked with combine to make this new Gaynes Borer the ideal machine for speed and accuracy! All-steel "open frame" construction, high-speed precision bearings, top quality throughout—all at moderate prices.

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- Table remains at pre-set height—bits travel into work
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QUALITY at the RIGHT PRICE

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WORKABLE

Fir plywood speeds, simplifies component fabrication

Difficult curved seat blanks are cut from fir plywood on a production line basis by the Williard V. Young Co., Sumner, Wash., component fabricator and furniture sub-contractor. The job is done on a specially adapted shaper, and the company reports use of plywood permits better profits on such normally low-margin items. Plywood's cross-laminated construction permits fastenings to be placed near the edge without danger of splitting, and its strength permits thinner and lighter pieces to be used. The panels can easily be cut to special shapes and machined to close tolerances.

VERSATILE

Adjustable unit meets changing storage requirements

Here's a new idea in flexible storage space being used by several firms who need storage facilities which can be quickly altered from time to time. The idea is keyed by the use of Texture One-Eleven "grooved" plywood which has ⅜" wide grooves on two-inch centers rabbeted into panels ⅝" thick. Placing these grooved panels either vertically or horizontally permits shelves or dividers of ¼" plywood to be re-arranged quickly and easily. Principle can be used for both movable boxes or permanent storage facilities. Plans for unit shown are available at no cost; see address below.

DURABLE

Overlaid plywood shelving is hard, smooth, long-lasting

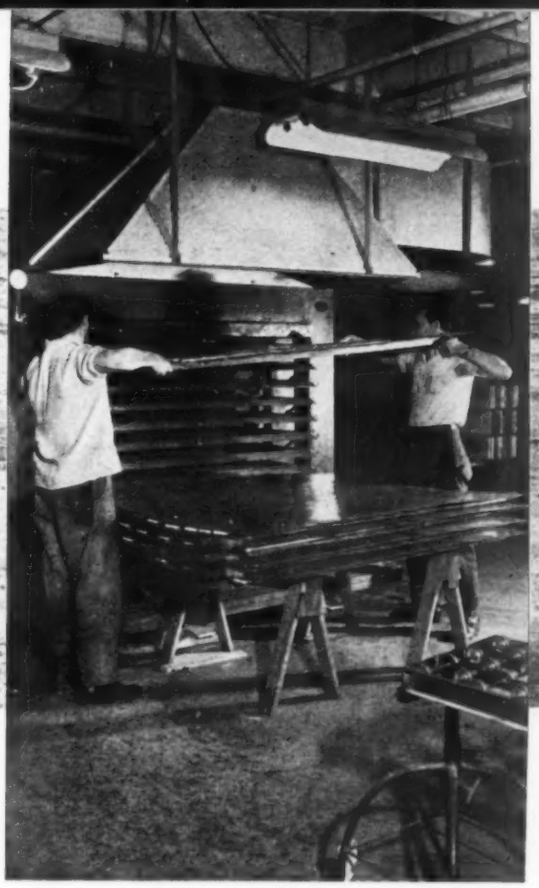
The hard, plastic-like surface of high-density overlaid fir plywood makes it ideal for shelving, countertops or other applications subject to wear or scuffing. Fused to the panel during manufacture, the overlay is highly abrasion resistant and many times harder than tempered or treated hardboard. The smooth surface permits packages to slide easily. Paint or other surface protection is not needed and the color (black, green or amber) is integral with the fused resin-fiber overlay. The result is low initial cost, less maintenance and fewer cleaning problems.

FIR PLYWOOD

Letters DFPA on panel back or edge attest manufacture and inspection under industry-wide quality control program. Individual grade-trademarks are specification guides to the right type and grade and the *right* quality.

FOR INFORMATION about specific plywood uses, or for basic specification-use data, write (USA only) Douglas Fir Plywood Association, Dept. 173, Tacoma 2, Washington.

veneer plywood & laminated wood section



- Are you using the best type of adhesive for your product? Be sure you know what is available and the advantages and disadvantages of each type. A number of suppliers have cooperated in helping us present information on how to select an adhesive.

- The demand for imported and domestic fancy woods continues brisk. Most of these exotic species such as teak, rosewood, myrtle, etc., are used mainly for accent and are achieving great popularity on many high styled lines.

- Do you believe that the retail salesman is still the weak link in your distribution program. It is not his lack of selling ability, but the fact that he does not know enough about the selling points of your product! Put more information on your selling tags and spend more time in demonstrations and talks at the retail store level.

- What are the new uses for softwood plywood? Two articles in this section relate how one company is getting better log utilization and what new products are being made from Douglas fir plywood.

- Japan's voluntary cut-back of veneer and plywood exports to the U.S. is showing door skins and plywood of Philippine lauan are in short supply here. Prices have advanced sharply.

- In this anniversary issue you will find a complete review of old developments and a look into the future. Be sure to read the article on research—where's it's been and where it's going. Research on adhesives helped to create plywood. What exciting new developments lie ahead which will also affect plywood?

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NC
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You get the glue you need, in any desired quantity, when you need it.
You get competent technical advice from National Casein's men who know glues.
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Second, your contacts with our factories are through competent, experienced, and practical glue men—men who also know glues.

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You be the judge! Write us at the office nearest you how much of any of National Casein's complete line of glues you need for a convincing test. Tell us if you want one of National Casein's Glue Men to contact you. No cost! No obligation!

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National Casein of New Jersey, Broad and Fulton Streets, Riverton, New Jersey

Boxed plywood beams which eliminate corrosion and shrinkage problems. Beams can be engineered for spans up to 120'.

Research and Promotion

By Douglas A. Jaenicke
Douglas Fir Plywood Association

Develop New Market For Fir Plywood

Back in 1948 if a prophet had said annual fir plywood production would almost triple in the next 10 years, people would probably have told him to trade in his crystal ball. But today, the fir plywood industry is on the threshold of a 5.7 billion square foot production year, almost three times the two billion feet produced just a decade ago!

Another spectacular barometer of plywood's growth is domestic per capita consumption. Ten years ago, it was about 10 sq. ft. per person. Today, it's a panel apiece—32 sq. ft.

In a little over a half century, the industry has grown from a box and drum factory near Portland, Oregon, to a $450 million business, employing about 40,000 employees in over 100 plywood mills in Washington, Oregon, California, and Montana.

Where does the 5.7 billion square feet of plywood go? Most of it—about 70%—goes into construction of some kind. This includes new homes, churches, schools, farm buildings, and heavy construction such as warehouses. Remodeling and modernization also consume vast amounts of fir plywood. The rest goes into literally hundreds of applications, including industrial uses such as box cars, signs, and pallets, crating, boat building, cabinet making, and do-it-yourself projects.

Quality Control, Research and Promotion Pay Off

Many plywood manufacturers give the Douglas Fir Plywood Association much of the credit for the fact that fir plywood has set a new production and sales record each year since 1946. The association's rigid plywood quality control and testing program has made the initials DEPA a hallmark of quality plywood wherever the material is used throughout the nation. Engineers, architects, and builders write in from all 48 states to take advantage of the information provided by the plywood association's design research program.

The results of design research by the DEPA and by individual companies indicates that plywood has only scratched the surface of its future potential. For example, a gun has been perfected which sprays a low-cost fiberglass coating on plywood in one operation. Aluminum producers are experimenting with backing new anodized surfaces with plywood panels. A fabricator has developed a plastic coating for plywood doors which he guarantees for 60 years.

Three Products From Research

Three outstanding results of fresh research in structural design are stressed-skin panels, box beams, and folded plate roofs. As builders press harder for labor saving products and faster production methods, these plywood components will come into their own.

Strong, lightweight plywood box beams which eliminate corrosion and shrinkage problems are attracting attention. They are one or more vertical plywood webs with lumber flanges laminated along their top and bottom edges.

Click's Veneer Tables

For Manufacturers, Dealers Anyone Who Works Wth VENEER, PLYWOOD, CUT LUMBER, BOXES, Etc.

A handy book of accurate tables for quickly determining square feet contents of veneer and the cubic contents of logs, complete to fractional units.

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ELKIN, NORTH CAROLINA

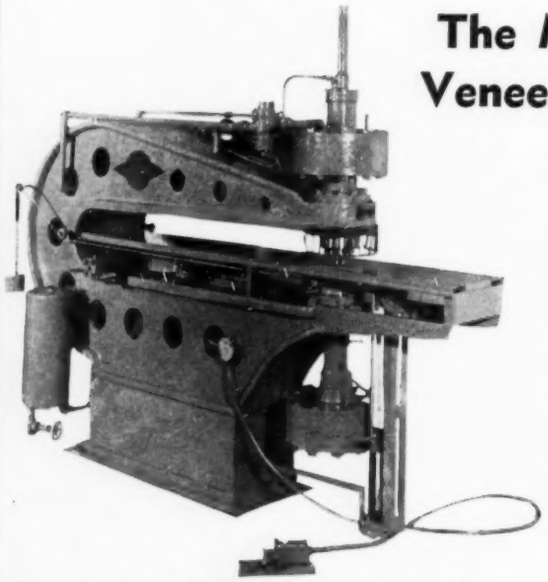
As the trend toward component construction grows, stressed skin panels are achieving a more significant role in all types of building. The panels are made up with sheets of fir plywood fastened to framing members. They can be quickly fabricated and cut conventional construction time in half.

Folded plate roofs are thin skins of fir plywood reinforced by purlins to form shell structures that utilize the high reserve diaphragm strength of plywood. They eliminate all trusses and other such members. The tilted planes lean against one another and the entire unit is supported by the walls. Large homes, school buildings, and warehouses are ideal places to apply this roofing method.

Stressed-skin panels are simply box shaped units whose framing members are covered with thin plywood skins. The framing members and cover skins act together to resist loads. The shear stress in the panel covers are transmitted between the plywood and the framing members by a glue joint. It is this joint that makes it possible for the structure to act as a unit. Stressed-skin panels make excellent

— S K O O G —

The Most Advanced Veneer Patchers Made



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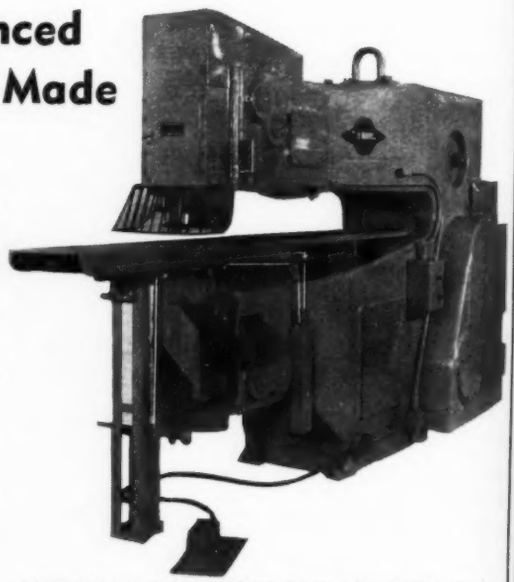
*Patent applied for



Mechanical Veneer Patcher—Type OB—Boat, semi-elliptical and round dies available

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OLYMPIA, WASHINGTON **P.O. BOX 102** **PHONE FL 6-8884**

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Three fifths of Guatamala's population is pure Indian. Most of the remaining population is half-caste. From the dense jungles of Guatamala comes the Prima Vera tree. Its wood is pale yellow in color and affords a high lustre, second perhaps only to Satinwood.

Your requirements in domestic or imported veneer and lumber can be filled from our inventory, famous for its wealth of distinctive and rare woods.

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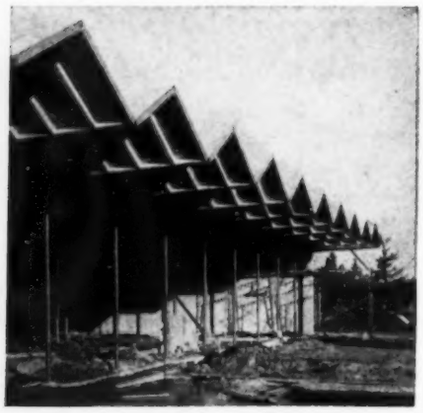
BOW
BETTER OFFICES FOR BETTER BUSINESS WITH FRIENDLY WOOD



Roof of this store building is a series of fir plywood folded plates. These thin plywood skins are reinforced by purlins and eliminate all need for conventional trusses. The tilted planes lean against one another.

walls, floors, and roofs in homes, churches, and industrial buildings.

Fir plywood box beams are hollow structural members that can be designed to carry sizable loads across spans ranging up to 120'. They have one or more vertical plywood webs laminated to seasoned lumber flanges. Varied methods can be used to fabricate the beams, but gluing is preferred. Box beams serve as ridge and floor beams, lintels, and rafters in schools, warehouses, and industrial buildings.

The Douglas Fir Plywood Association is continuing research and testing in the field of components and hopes to work out a program in which it can be a promotion agency for component fabricators.

Plywood's Future

A prophet of 1958 would have a hard time over-estimating a potential of the next few decades for the fir plywood industry. One of the nation's top economists told western fir plywood manufacturers at their summer meeting, that demand for plywood in the next four quarters will rise 7% to 5.9 billion square feet. Peter W. Hoguet told 280 mill officials that the combined impact of construction activity and industrial production should bring plywood demand to an annual rate of 6 billion feet by the second quarter of 1959.

Many industry leaders believe that plywood demand will reach 7 billion square feet by 1960.

Quality Is Important

To protect plywood's future, the DEPA is intensifying its quality control program and is making it the cornerstone for all promotion. This fact is important because a small but significant amount of inferior plywood is continuing to reach the market. The builder or architect who has been let down by unstable glue-lines or substandard veneers frequently becomes allergic to plywood in general, even scorning those panels which have been tested and inspected under DEPA's comprehensive, proved program of joint industry quality control. Therefore, the association will continue to emphasize the quality assurance behind the DEPA stamp for the architect, engineer, builder, dealer and consumer.

Continuous Production, Greater Economy with a

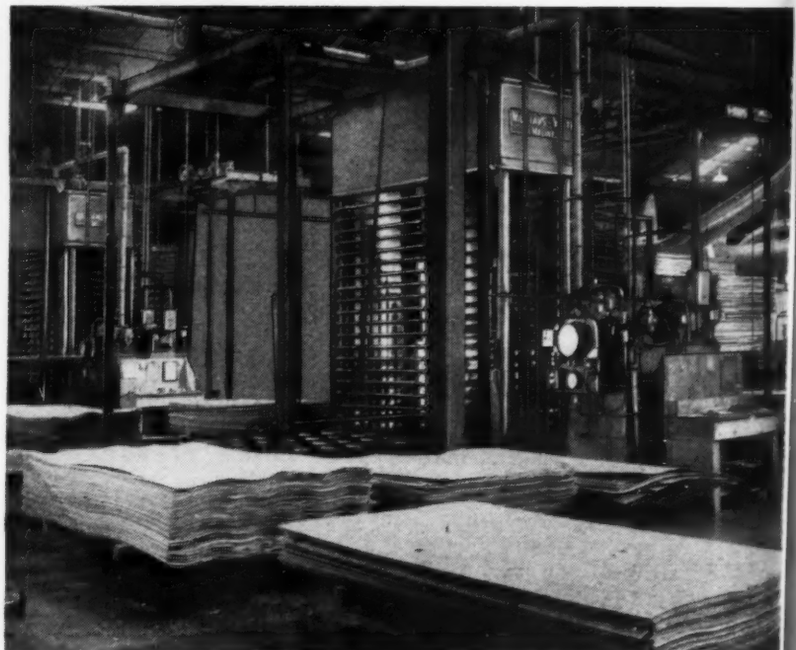
WILLIAMS-WHITE HOT PLATE PRESS

If you are considering the purchase of a hydraulic press for producing plywood, hardboard or allied products on either an experimental or production basis, the WILLIAMS-WHITE Hydraulic Press should be included in your planning.

Low initial cost, long and trouble-free life, and complete customer satisfaction and confidence displayed by over 280 laboratory and production installations, truly make the WILLIAMS-WHITE Hydraulic Press the hallmark of the industry.

A typical example of repeat orders is the installation of two 572-ton, 106" x 54" hot plate presses, illustrated, in the Merlin, Ore., plant of Bate Lumber Company.

Why not discuss your requirements with us before you buy?



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PRESSES • BULLDOZERS • BENDERS • PUNCHES • SHEARS

Novoply eliminates costly waste, gives you a sturdy, durable product because it takes and holds screws and nails without splitting, even when they are driven into its edge.

Will your core stock pass this test? Novoply can!

For cabinets, built-ins, doors, partitions, counter tops or core stock—Novoply is the answer.

Try the simple test illustrated. It will demonstrate the internal bond strength which is just one of Novoply's virtues. It works cleanly with modern power tools, is water-resistant enough for sink tops, and because it stays flat there's no danger of costly waste from warping in storage. Finishes beautifully natural, stained, or painted.

Novoply is *ideal* as a core stock for plastic laminates and face veneers because its smooth, flat faces take glue evenly with no "photographing," ridges, hollows, or ripples.

You can order Novoply in thicknesses from 3/8" to 2" and in sheets up to 6' x 12'. Also available: Novoply P. G., a new premium-grade version of Novoply for smooth, 2-coat paint finishes. Cut-to-size service including any type of woodworking operation is available on production quantities. For more information on how you can profit with Novoply, mail the coupon today.

NOVOPLY HAS NO GRAIN, so there are no face checking, grain raise, or waste pieces due to grain direction. A 3-ply engineered panel, Novoply has face plies of precision-cut wood flakes over a core of specially graded wood chips. All are resin-impregnated and bonded under heat and pressure to give you a hard, flat, strong, and warp-free panel.

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Weldwood Adhesives, Flexible Wood-Trim®, Firzite®, Satinlac®, Satinlac® Lightener, a full line of softwood and hardwood plywoods

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Please send me a free sample of Novoply, and new engineering data booklet detailing results of Novoply tests and giving application information.

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Your plant's name should be on this tag!

The New Model "B" Mann-Russell Electronic

Continuous Flat-Plane VENEER EDGE-GLUER

INCREASES OUTPUT — WORKS FASTER and BETTER — COSTS LESS

1. The ONLY Electronic Veneer Edge-Gluer virtually ARC FREE.
2. NO GLUE BUILD-UP or adhesion on electrodes.
3. Veneer moisture content no longer critical.
4. No joint fall-down from stopping-starting of Edge-Gluer.
5. Maintenance costs minimized.
6. Increases reject-free output.

PLUS . . .

7. EXPERIENCE AND "KNOW-HOW" in electronics and veneers.
8. PROMPT and QUALIFIED SERVICE.

If you now operate a Mann-Russell Model "A", you can modernize it to the improved Model "B" at low conversion cost to obtain all the above advantages.

ALSO . . . Ask about the Mann-Russell VENEER MOISTURE INDICATOR

Detects and marks veneer with excess moisture . . . helps eliminate hot press "blows" and glue failures

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Aerial view of new U. S. Plywood Youngs Bay plant at Roseburg, Ore.

NEEDED: PEELER LOGS

Roseburg Plant To Cut More Logs From Each Tree

One of the most modern fir plywood plants in the world—the new 180,000 square foot United States Plywood Youngs Bay plant—began operations in 1958 at Roseburg, Oregon. Why did U.S.P. build a new plant in the Roseburg area when there are already other plants for sale? The answer reflects top management thinking in the continuing progress of the firm. This new mill is a streamlined operation in every sense of the word.

The mill is integrated both vertically and horizontally. It starts with the standing timber and ends with finished products—either plywood or lumber. Modern chip handling facilities dispose of by-products profitably. The Roseburg plant is located on a railroad with an abundant supply of Douglas fir near-by.

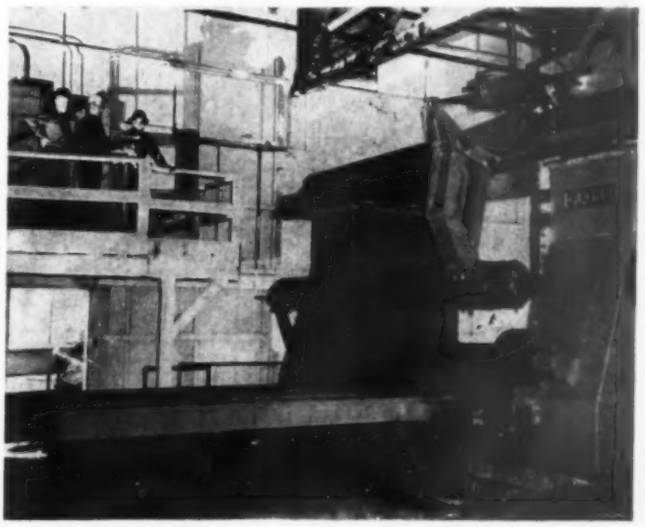
What's different about Roseburg? U.S.P. expects to increase yield and lower costs by challenging a basic concept of the industry. It has long been recognized that the best veneer comes from the biggest, most expensive logs—these are usually the logs at the base of the tree. The best logs go to the plywood plant and other smaller logs to sawmills.

Growth of a typical fir tree explains the situation in this way. As a tree grows, its lower limbs are denied access to light and they wither and die. Thus in time the lower portion of a tree contains clear, knot-free wood. In fact, by the time the trunk is 3'-8' in diameter, it has a generous amount of the perfect premium wood known as deep clear.

These deep clear logs are ideal for plywood. Cut into 8' lengths, debarked and peeled, they yield thousands of feet of high quality veneer. Of course, the larger the log, the more veneer it contributes and the longer length running time for the lathe because it need not be shut down while logs are changed.

Unfortunately, these deep clear logs are expensive. A typical fir gives three 8' lengths of deep clear logs from the lower portion. Above this area there may be two 32' saw logs suitable for top grade lumber. Higher still the wood may be good enough for low-grade logs. Oftentimes this part of the tree is chipped for paper or particle board.

There have been more plywood mills established in the northwest area of the country than sawmills. For this reason, good peeler logs are in short supply. Now Roseburg is taking a new approach to this entire problem. Veneer from shallow logs is just as good as that from deep clear logs, but there is less of it on each log. Now U.S.P. is going



First operation in U.S. Plywood's new plant is a high speed barking operation. After this, logs go to huge steam vats.

We Specialize in . . .

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- cherry

Veneers
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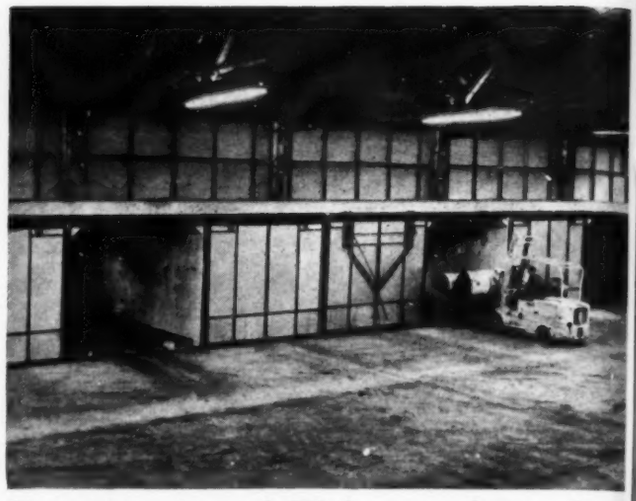
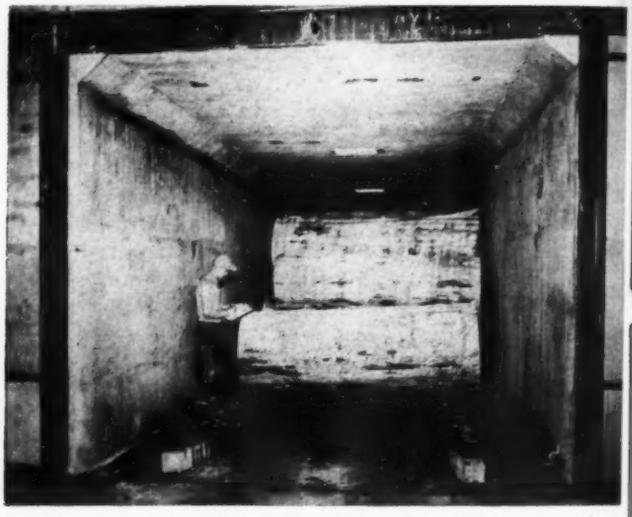


Giant steam vats—each 70' deep—are feature of new U.S. Plywood plant. Each one of 10 garage-like vats will hold logs for half of a shift's run, cooking them in 200° temperatures for up to 24 hours to soften and equalize texture for peeling.

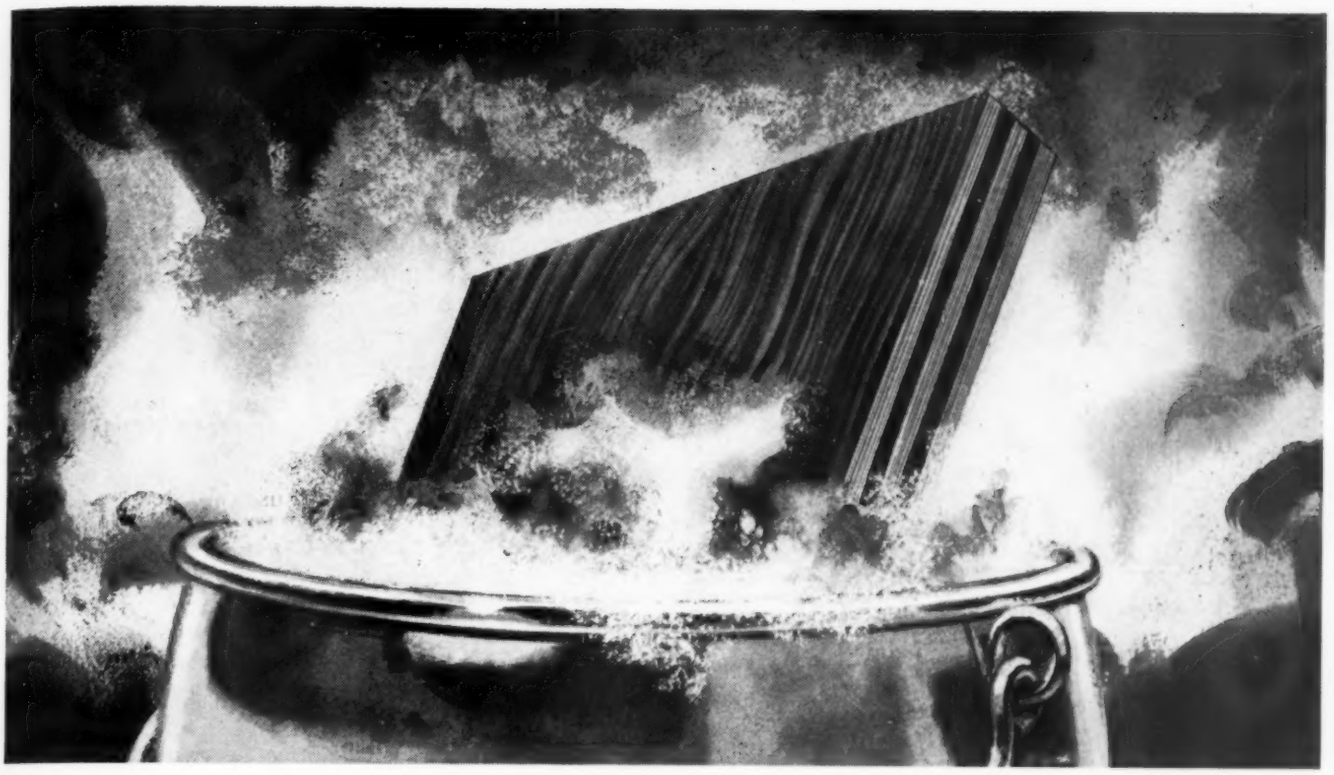


Ten steam vats which "plasticize" logs before peeling.

after shallow clear logs as its prime source of supply. The plant can handle the large peeler logs, but if the price is right, it can assign them to the lumber mill for cutting into the highest grade lumber.

It has taken a lot of know-how and cooperation with machinery manufacturers for United States Plywood to be able to process these shallow clear logs at less than competitive costs. To do the job, George French, plant manager at Roseburg, has turned to some of the techniques used in peeling hardwood logs. Hardwood logs are usually steamed to facilitate cutting and increase the yield. French reasoned that the same thing could be done with fir. Logs are debarked at Roseburg at the rate of one a minute. Then they are placed in big steam vats for several hours. When they are taken out, the logs cut as easily as butter.

For the first time in the industry, it's possible to get high quality veneer from sapwood—the outer layers of living fiber near the bark. Because sapwood is usually brittle, veneer from sapwood comes off the lathe in a wavy irregular cut. But the hot



The WOOD may cook away but the glue-line holds!

New Melurac® 305

Those even slightly troubled by waterproof bond specifications CS 35-56, Type I, can take comfort. You can surpass them with two Cyanamid Adhesive Resins!

NEW MELURAC 305 IS BETTER—AND COSTS NO MORE!

With persistent upward revisions of adhesive requirements, we are proud to announce MELURAC 305, a considerably improved melamine-urea-formaldehyde adhesive resin, *at no increase in price!*

For fully waterproof bonds, it surpasses specifications, even with woods most difficult to bond—such as heart gum—and with short or immediate assembly times. Its super boil resistance easily takes the double cyclic four-hour boil. MELURAC 305 is non-staining, easy to handle, cures at moderate temperatures, and can be used with catalysts for cure rates as low as hot-press urea resins.

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CYMEL resin 401, an unmodified melamine-formaldehyde resin adhesive, goes even farther in exceeding values of the most demanding commercial and military specifications for exterior or marine grade plywoods.

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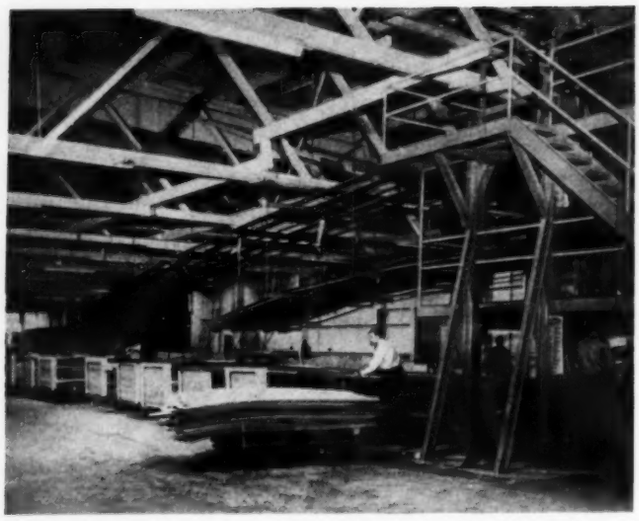
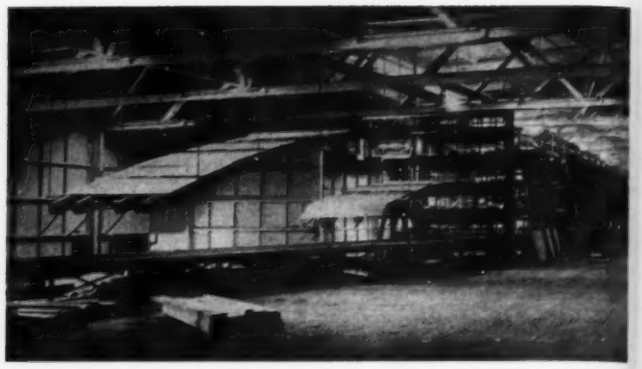


After peeling, veneer is semi-automatically clipped and graded on three levels simultaneously on its way to dryer. On trip through dryer, veneer moves on five tiers.

logs cut much better and the lathe can trim them closer to their intended size. "It just never made sense to me," says French, "to spend a lot of money getting A-grade veneer for the top layer and then sanding two-thirds of it away when the plywood is sized."

Working on this theory meant making a number of changes. First of all, greater care had to be used in felling the tree so that the upper parts of the trunk would not be damaged. Next, in loading the



Triple-tiered conveyor brings veneer to dryers at new 180,000 sq. ft. plant.

log slings were used instead of pinchers which might pierce the bark. The men had to learn to cut the top and middle parts of the tree so that it would be easily divisible into 8′ lengths for the plywood mill.

Other changes had to be made at the mill pond. At Roseburg you will not see men moving the logs with sharp pikes. Instead, water jets nudge the logs along gently.

When it came to planning the work, U.S.P. decided to have all of the men work at hip level. In this way, no one has to bend over to pick up tools or material. According to the company, this lets the plant produce about 25% more because the men are not as easily fatigued.

U.S.P. also saves money at the clipper. Standard

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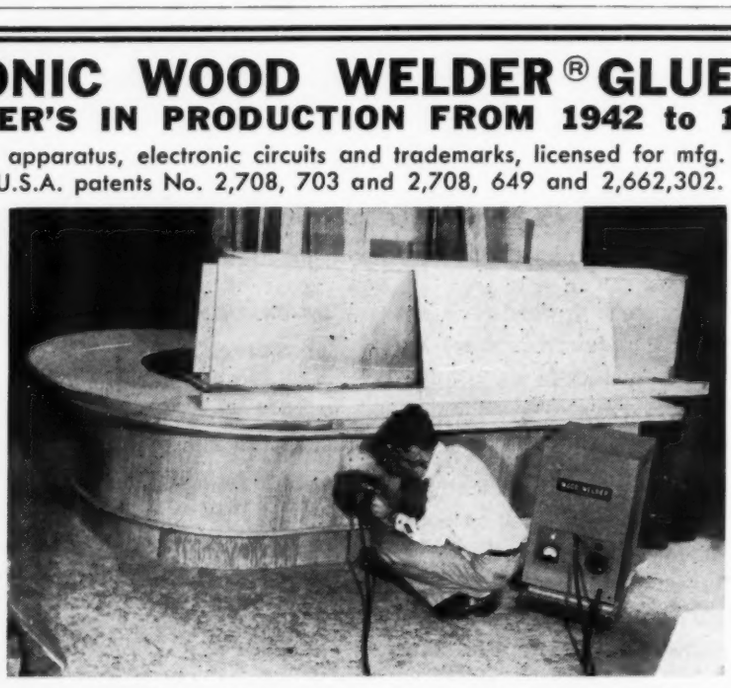
WOOD WELDER'S IN PRODUCTION FROM 1942 to 1959 MODELS.

Electronic glue drying apparatus, electronic circuits and trademarks, licensed for mfg. by Cavitron Electronic Oscillator Co., under U.S.A. patents No. 2,708, 703 and 2,708, 649 and 2,662,302.



1959 CAVITRON® WOOD WELDER® Model 2000 is equipped with two RCA, 833A oscillator tubes, two 866A Rectifier tubes, plus portable hand gun and R.F. Electrodes for less than $675.00 F.O.B. Factory 3,000 Watts of electrical power, in thermo-flex electrode, for plastics or veneer edgebanding, is available as accessory, for connection to tooling power outlet in 1959 Model CAVITRON® WOOD WELDER® 72" Length, continuous pressure and heating cycle, applied also to round corners.

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You can turn out laminated curved panels with a Columbia High-Frequency Press, using low-cost, metal-faced wooden dies that can be made in any woodworking shop. The fast, simple operation gives high production from a single set of dies; saves floor space by eliminating storage required for curing. For double versatility, the same press can be switched over quickly to conventional cold press work.

Open a new field of profitable production! You can produce laminated curved panels such as chair seats and backs, case goods, fronts, cabinets, etc. at low cost and high speed. Columbia High-Frequency Presses meet all FCC and safety regulations.

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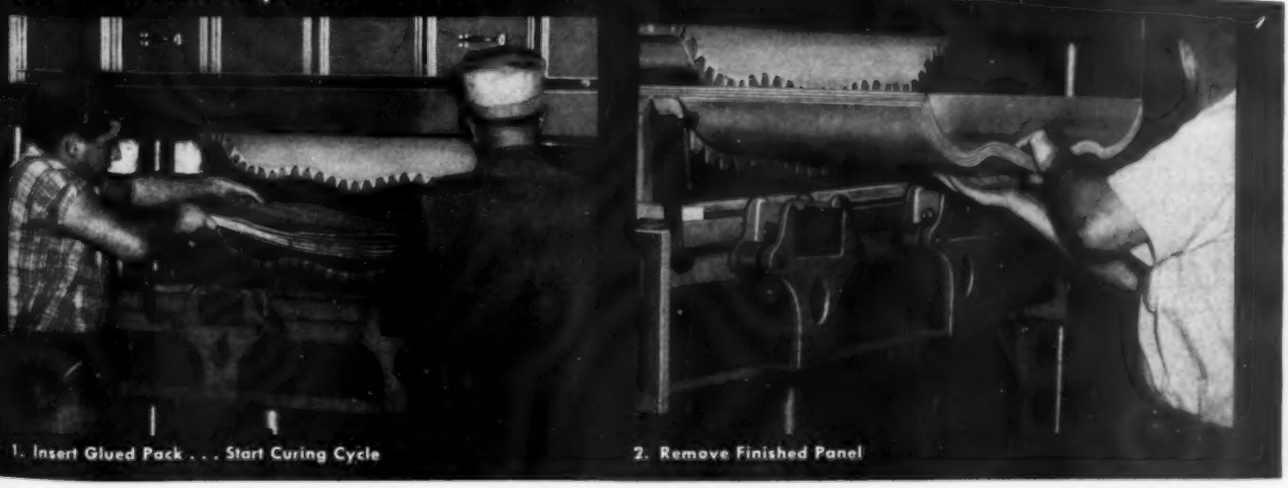

1. Insert Glued Pack . . . Start Curing Cycle

2. Remove Finished Panel

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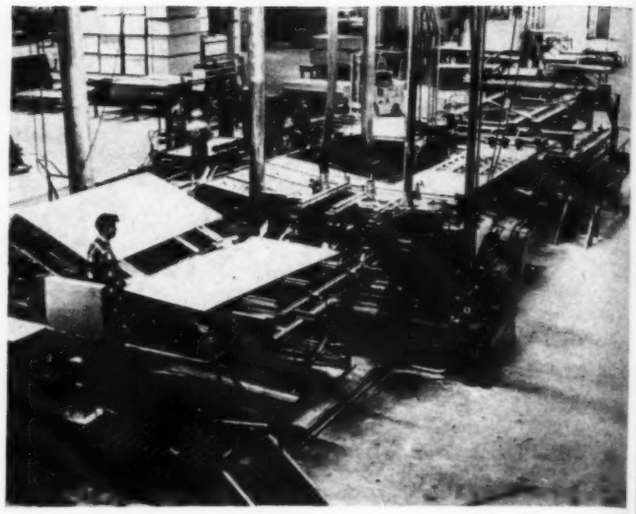
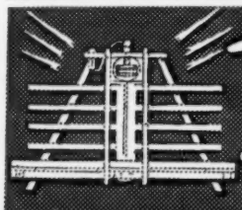


Incredible skinner and trim saw operated by one man. It trims panel edges and stacks panels in one automatic operation after hot pressing.

industry practice is to run the veneer through two clipper stations at 125 f.p.m., with a marker and clipper to do the job. However, at Roseburg there are three clippers and the rate has been slowed to 100 f.p.m. At this speed a clipper does not need a spotter to help him. The result is that three men can handle 50′ more veneer every minute than four men in a standard installation.

This is only a brief report on the Roseburg operation. Watch for the complete story to appear in a later issue.



The Bennett 2-WAY PANEL SAW

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No lifting or turning of unwieldy panels!

Anyone can operate - skill not required!

No need for a square!

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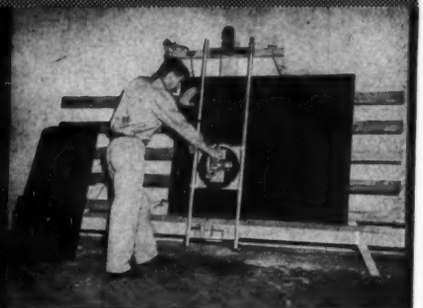

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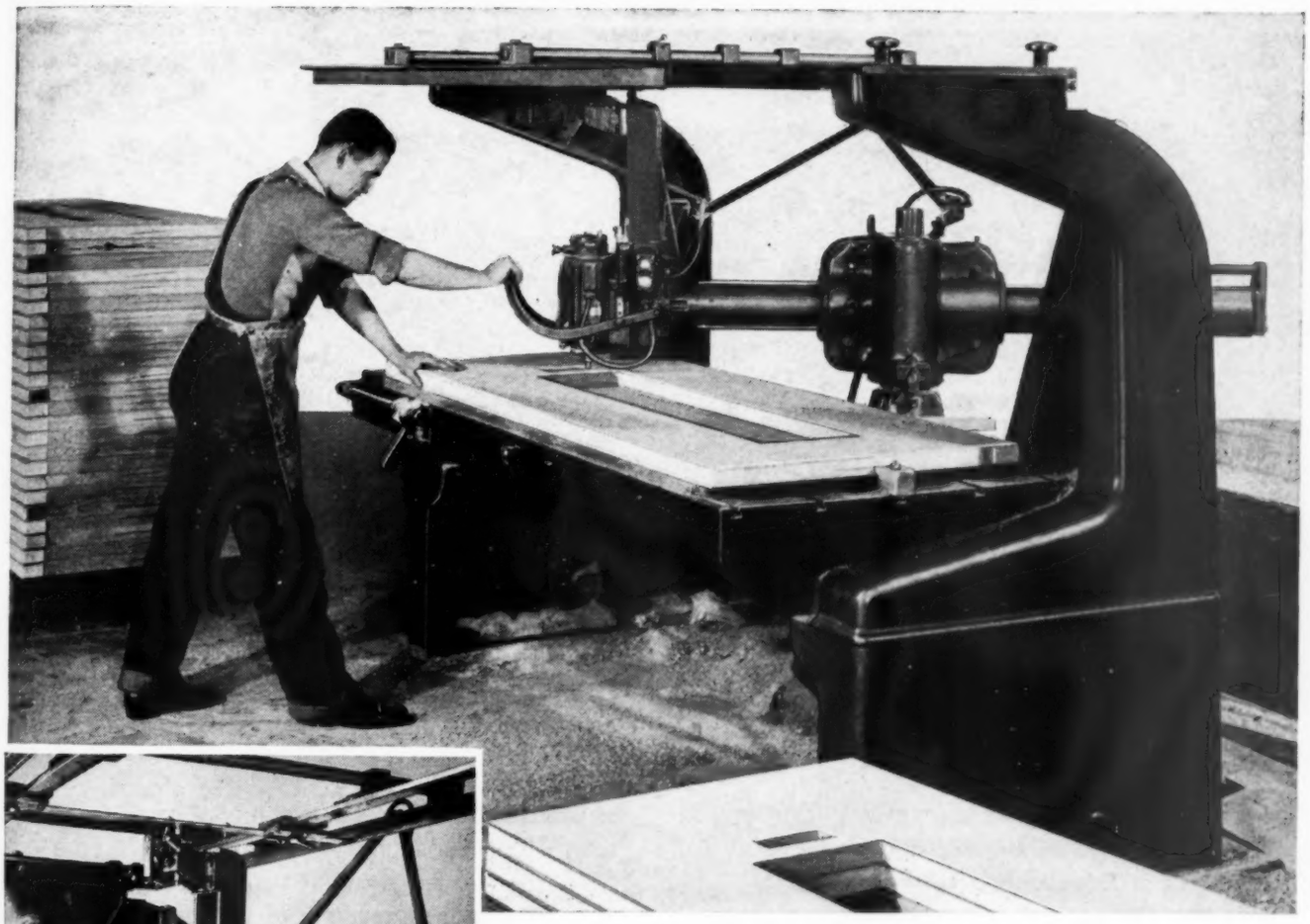
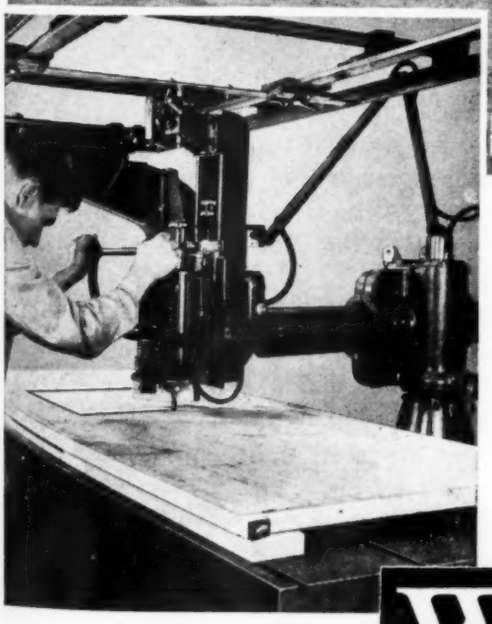
NEW and faster method of

Cutting shapes in flush doors!





Window and letter-box openings on flush doors can now be cut in a fraction of the time normally taken. That's because the Wadkin Radial Router L.F.H. has been specially designed for this type of work. Basically, it consists of a high-speed (24,000 r.p.m.) router head being manually worked round a template attached to an overhead frame. The necessity of marking out or clamping a template to each door is eliminated—over-all production times are drastically reduced! One operator cuts any shape up to 2¼" deep with ease, speed, and consistent accuracy. The machine can also be used for panel raising or recessing casket sides, stair stringing, grooving and housing, etc. Provision is made for adapting the machine for conventional fixed head working when required.

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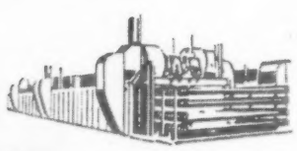
Mt. Rainier will sedately radiate its beauty eternally but as the trees mature they will be harvested and converted into many useful products.

Some trees will be cut into lumber but prime logs will be peeled into veneer for plywood and used in some one of a thousand different products for the service of mankind.

Into these operations fit specialized machinery which necessarily must be so efficient as to extract every possible penny of profit from each log processed.

In the veneer manufacturing industry the name ***Coe*** stands out in bold relief identifying a company that has participated in the growth and development of the plywood industry in this country.

Consistently from the early days ***Coe*** has expanded and improved its machinery while — advising — equipping plants — counseling regarding operation problems and in many ways assisting veneer producers to attain better and more profitable methods.



THE COE MFG. CO.

Painesville, Ohio

GLUE'S ROLE

In An Expanding Market

By
Bart H. Thielges
Sales Manager
National Casein Company

▼ When ancient man wanted to bind two pieces of wood together he used lashings made of rushes or other pliable vegetable growths. It could have been that Moses' cradle floating on the river was found in the same kind of rushes with which the tiny craft was fastened together.

As man made further use of the intelligence with which he had been endowed by his Creator, he used rope, pegs and nails as fastenings. Just when glue entered the picture is a matter of conjecture. There is evidence that the ancient Egyptians had some knowledge of the use of glue, because some of the furniture found in their tombs is said to be glued with casein glue. Evidently this became a lost art. Casein glue did not again enter the picture until the 20th century.

Animal glue is probably the oldest and best known of all the wood glues and its early discovery probably can be attributed to the fact that man must eat and he made it his business to find all he could about his four-footed provider of food and clothing.

If strength of bond were all that industry required of a woodworking glue there would have been no need to develop other types than animal glues. However, animal glues had limitations and the woodworking industry would not have had a chance to grow into anything like the mass production industry it has become without the developments in glues which have been made during the past 30 or 40 years.

Vegetable glues, which have a starch base and are made mainly from cassava flour, enabled the plywood industry to grow rapidly. When casein glues came into the picture, we were for the first time able to make plywood which was reasonably water resistant. The plywood market naturally expanded as the result of the new uses to which plywood could be put. Soybean glue found extensive use on the west coast for the manufacture of Douglas fir plywood.

All of these animal and vegetable products did, and in fact are still doing, a good job. For many gluing jobs they will never be replaced by the newer developments. However, the woodworking industry was faced with increased competition from the metal and plastic industries which had turned to mass production methods. Articles which had always been made of wood were now being made of metal and plastic at a cheaper price, and some of the market for wood was being lost as a result.

One of the bottlenecks which was preventing the mass production of wood products was the glue room. Although many new machines had been put into use for cutting and shaping wood, these machines had to wait on the glue room which was still using archaic methods with glues which were slow setting and did not measure up to the demands for water resistance and strength called for by modern day living. Furniture was still being handmade as far as gluing was concerned. As labor costs rose, wood was being priced out of the market.

In the 1930's chemical laboratories began to experiment with a combination of urea and formaldehyde. It was found that when these materials were combined under a controlled cycle of heat and pressure they formed a resin which had very good adhesive qualities. Further experiments with setting agents or catalysts revealed that this new glue could be made to perform under a variety of different conditions. The glue could be made to set instantly or at any time over a period of hours. It was also found that heat would greatly accelerate the setting of a urea glue line. In comparison to the then existing glues, the possibilities of this new resin as a glue seemed limitless. When cost figures were assembled it was found that ureas would be more economical to use than many other glues. Because of urea resins 'high solids' at point of use, warpage problems were almost eliminated.

The woodworking industry was quick to accept urea resin glue. Machinery companies designed hot presses, new types of rubber rolled spreaders and conveyor lines to take care of the increased production rolling out of the glue rooms. Furniture manufacturers were stimulated in their designing because it was now possible to make curved plywood more economically, and, because resin bonded plywood was water resistant, they adapted it to new uses.

Because urea resins are thermosetting, new machines were built which definitely helped the woodworking industry to go on a more efficient production basis with substantial cuts in costs. Steam plate core presses not only do the

work of several clamp carriers but save on space. Tapeless veneer splicers do a neater job much faster than tape splicers. It wasn't too long ago that dozens of clamped panels being edge banded was a common sight in a furniture factory. Now several different types of presses, using heat furnished by electricity, do the same tedious job quickly, efficiently and with the use of a comparatively small work area.

One of the newer forms of energy used to cure thermosetting glues is high frequency or electronic heat. The most common use for high frequency is in the manufacture of corestock and dimension stock. There are many successful installations making curved plywood and also the bonding of panels to frames by high frequency methods has almost become standard practice in the cabinet industry.

Some of these machines have been a definite challenge to the glue manufacturers' technical staffs. But on the whole these challenges were met with new glue formulations, different catalysts and a lot of good old fashioned trial and error methods. Sometimes modification on the original machine design was the answer to an especially difficult problem of adapting the right glue to the machine. In all cases the net result was a better wood products made more economically.

Waterproof glues of the resorcinol, melamine and phenolic types have opened up entirely new markets for the woodworking industry. Now we can make trusses and beams for buildings with glue lines which can resist the worst possible climatic conditions, outdoor furniture, bridge members and waterproof plywood.

Polyvinyl glues, which require no mixing and which are fast setting without the use of heat, now find wide use in the manufacture of plastic faced panels and also for assembly gluing. It is a revelation to note that small but progress minded woodworkers are willing to pay a premium price for polyvinyl glue because of the extra production it gives them.

What lies in the future? Well, that's difficult to answer, but you can bet your last dollar that at this very moment a woodworker, a machinery designer and a glue man have their heads together trying for an answer to a new gluing problem. And you can make a parlay by betting that they will find the answer!

We are still looking for that perfect glue. You know, that's the glue which will do everything. It should come ready mixed, set immediately regardless of temperature, have eternal pot life, sharpen cutting tools rather than dull them, give absolute waterproof glue lines, store forever and cost but a fraction of a cent a pound. Don't laugh, we have many letters on file asking for just such a glue.

Frankly, I hope that a perfect glue will never be formulated. If it does happen, gone will be all the romance and adventure in a glue peddler's life. It would indeed be sad to contemplate a world in which there would be no more gluing problems to conquer.

We, of the glue trade, would very much rather savor our frequent victories over knotty gluing problems and hear a customer say as they often do, "Your salesman's ideas and suggestions have saved us thousands of dollars." That's living, buddy!

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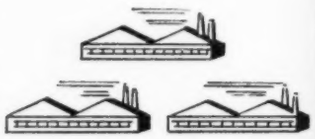

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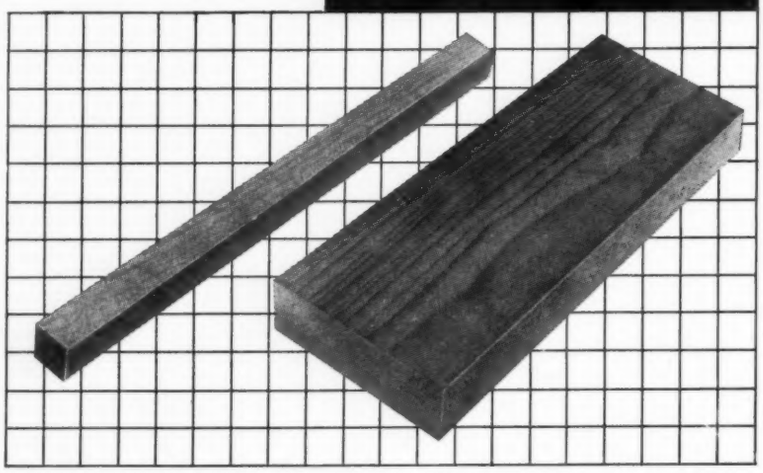

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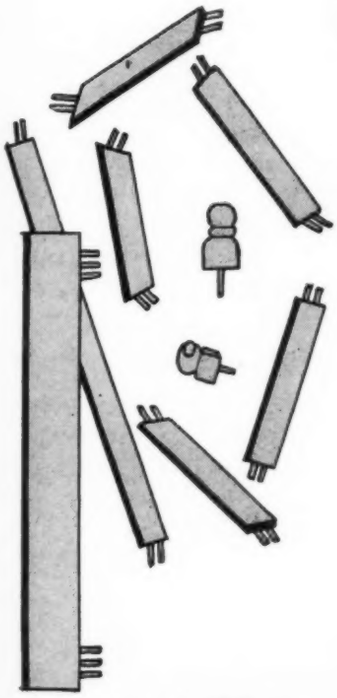

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A Panel Discussion . . .

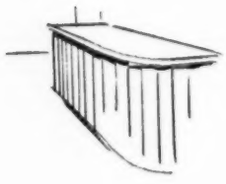
WOOD UTILIZATION: What Has Been

We asked a number of associations to answer six questions. Here are replies from seven associations, fairly representative of the entire woodworking field. These men sent in their answers independently. However, notice that particular points are emphasized in all of their replies.

L. M. Clady
Secretary-Manager
Maple Flooring
Manufacturers' Assn.

Teel Williams
Executive Director
Mahogany Assn., Inc.

George C. Romeiser
Secretary-Manager
American Walnut
Manufacturers' Assn.



What are the best, or some of the recommended, utilizations for the wood species represented by your association?

American Walnut Manufacturers' Association

The top market for walnut is, of course, the furniture field where its versatility is illustrated by its use in a broad range of styles from Modern through French and Italian Provincial and Early American.

Second most important use is for architectural purposes, including fixtures, paneling, trim, etc. In novelties, walnut is finding an increasingly important position, and remains the unmatched wood for gun stocks.

California Redwood Association

While California redwood has been utilized in more than 100 ways, perhaps its greatest utilization is in exterior siding. Other important uses include interior paneling and window frames for residences, schools, churches, civic and commercial structures, and for industrial tanks and cooling towers.

Fine Hardwoods Association

The well-known and time-tested uses for fine hardwood veneers are household furniture, wall paneling, office furniture, boats, caskets, and many more.

Mahogany Association

Mahogany finds its best use in all types of household furniture, office furniture, TV, hi-fi and radio cabinets, wall paneling, caskets, and yacht hulls and upper structure.

Maple Flooring Manufacturers Association

As the name indicates, this association is interested in maple as a flooring material.

Northern Hemlock and Hardwood Manufacturers Association

The best or recommended utilizations for these woods are exterior trim, framing, roof boards, sub-floors, joists, rafters and plates. The woods represented in this association include: maple, birch, beech, ash, elm, basswood, oak, norway pine, white pine and hemlock.

Southern Pine Association

About 75% of all treated poles in use are southern pine. This wood is used for house framing, siding, paneling, structural components such as wood trussed rafters and laminated lumber arches and beams.

Accomplished? What Needs To Be Done?

E. Howard Gatewood
Exec. Vice-President
Fine Hardwoods Assn.

S. .P. Deas
Vice-President
Southern Pine Assn.

Willard E. Pratt
California Redwood
Assn.

and
William A. McGraw
Secretary-Manager
Northern Hemlock &
Hardwood Mfrs. Assn.

What developments, or developments, in the last 25 years have helped to promote the species of wood in which your association is interested?

Mr. Romeiser for Walnut

Perhaps the most important development in recent years is the outstanding work done by the finish manufacturers who can produce about any color imaginable on walnut.

Mr. Pratt for Redwood

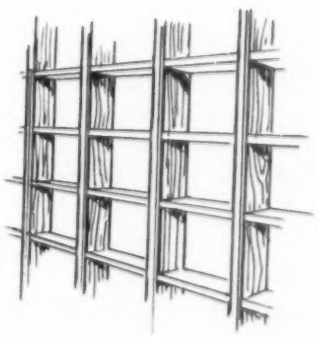
By far the greatest help in improving the quality of redwood lumber and promoting its use has been the improved seasoning methods.

Mr. Gatewood for Fine Hardwoods

The machining of fine hardwood veneers has been substantially improved in the last 25 years through such developments as automatic knife sharpeners, better drying techniques, tapeless splicers, hot plate presses, etc. Synthetic finishes have certainly brought about a better utilization of hardwood veneers. We are now seeing the introduction of polyester and epoxy finishing materials to give an even better surface to hardwood products. The development of prefinishd panels has certainly helped the sale of hardwood plywood materially, along with the "Naturalness Era" in home and office decor. The development of the improved resin-type glues has also helped to broaden the market for products made from hardwood veneers.

Mr. Williams for Mahogany

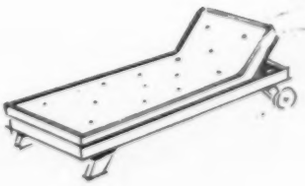
Better machining has been important. Improved materials and skilled techniques have brought about great versatility in color and texture possibilities of finishing to meet demands of style and fashion in furniture.



Mr. Clady for Maple Flooring

During the past 25 years, northern hardwood flooring makers have taken an active interest in standardization. All northern mills under association supervision now use the same size tongue and groove and place them in the same location as to distance from top to bottom. As a result of mutual interest in standardization, flooring made at various mills can be laid in one floor without uneven matching.

The development of floor finishing products suitable for close-grained woods has opened up a wide market. Our association began laboratory research on finishes in 1930 and has continued to the present time. The laboratory has approved, to date, over 90 floor finishing products.



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Mr. McGraw for Northern Hemlock

At present, manufacturers in our association are looking forward to necessary research. A diminishing supply of hemlock has slowed some promotional efforts.

Mr. Deas for Southern Pine

Great progress in the field of forest management and an industry-wide program of high standards have greatly contributed to the promotion of southern pine during the last 25 years. According to the U. S. Forest Service, present growth of southern pine sawtimber exceeds cut by 22%. Revision of grading rules has helped to emphasize the increasing demand for high quality.

Did manufacturers feel that particle board was a frightening new development that would offer great competition? What is the attitude today?

American Walnut Association

Generally the walnut manufacturers have not had to share the concern of many others about the inroads of particle board. This material does not replace face veneers, but rather core lumber. Undoubtedly there are many millions of feet of walnut veneer now used in furniture products with a particle board rather than a lumber core.

California Redwood Association

Redwood lumber manufacturers were not panicked by the arrival of particle board on the scene. They look on it as an interesting new development and will be inclined to consider the manufacture of redwood particle board when the market indicates the ability to absorb additional capacity.

Fine Hardwoods Association

I do not know that any veneer manufacturers ever felt that particle board was a frightening new development, although our industry has certainly been interested in watching it develop. We do not feel that particle board will ever find acceptance as an exposed surface.

Mahogany Association

Particle board, although it has certain decorative values and can also be used for structural purposes with face veneers, has not generally been accepted for fine furniture. Therefore, particle board was never really considered as competition for mahogany.

Maple Flooring Manufacturers Association

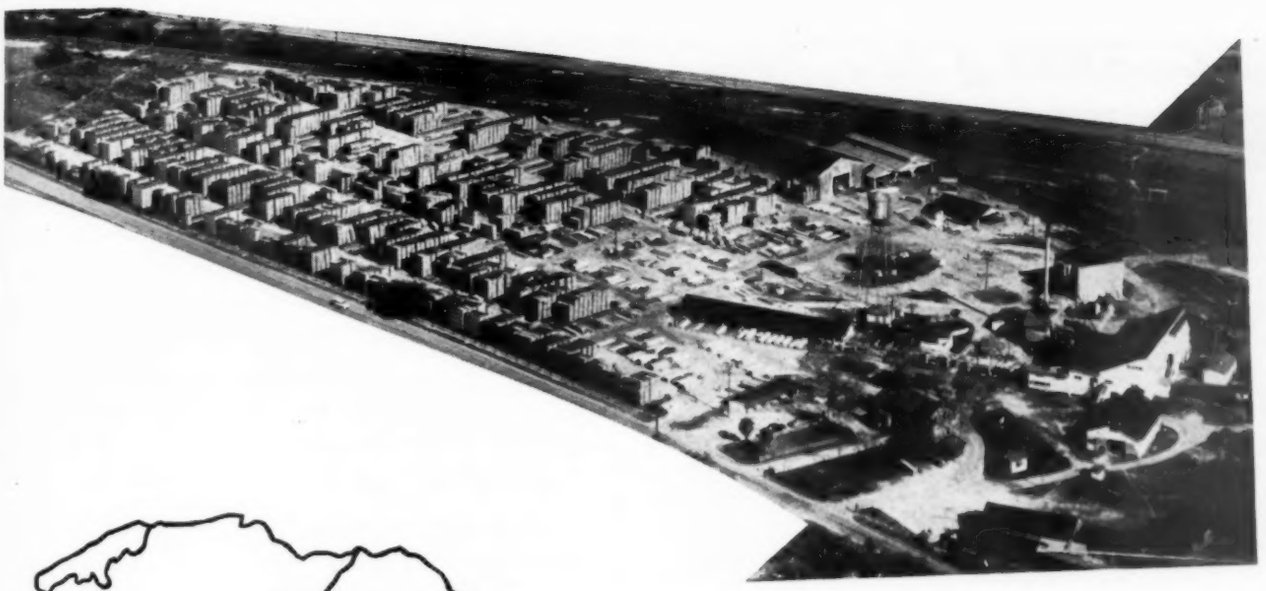
The development of particle board should not worry our industry. Actually, several flooring mills are interested in its potential and manufacture. Concerning plywood, this industry has been interested in the type suitable for sub-flooring right from the beginning.

Northern Hemlock and Hardwood Association

No, the hemlock manufacturers were not particularly concerned, in view of the fact that hemlock is not used as a core stock.

Southern Pine Association

I would not say we are exactly "frightened" by developments in board products. Here is a statement



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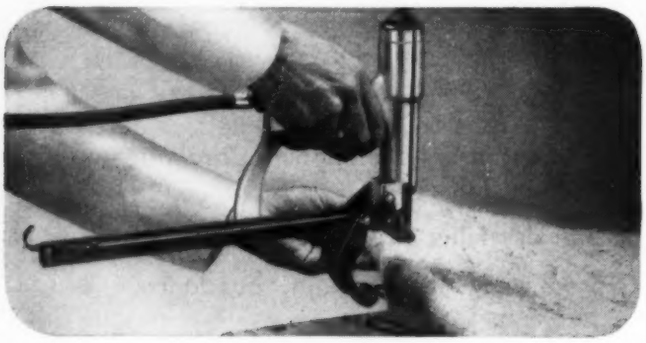

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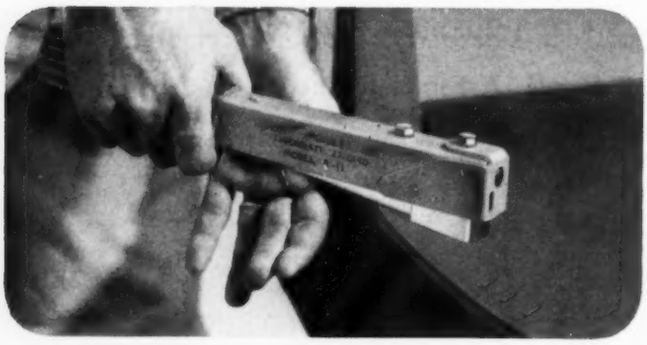

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by Latane Temple, chairman of the Southern Pine Association Research Committee: "I believe we can look forward to a new era where the fantastic fiber producing potential of our southern forest lands will be utilized at a rate approaching 100%. Board and fiber products as yet undreamed of, will come into being. Our industry is about to move forward into its golden age."

A few individual lumber firms are conducting their own research into board products.

Have there been other situations that your association has had to overcome? Lower grade lumber being upgraded and popularized might be an example.

American Walnut Manufacturers Association

The walnut industry has made an effort to stimulate interest in the wide range of veneer types characteristic of this species. Natural marked wood with pin knots and wild grain have been employed in ingenious ways to create unusual effects in furniture. In regard to the lower grade of walnut, here too, wattled or character marked lumber has become popular for paneling and some furniture.

California Redwood Association

Perhaps the most important situation which the California Redwood Association has had to overcome was the great increase in the amount of poor quality redwood lumber produced by many new mills in the years immediately following World War II.

Fine Hardwoods Association

Our industry is concerned about the products on the market made of substitute materials, but imprinted with an imitation wood grain and advertised through the use of a genuine wood species name. We feel this practice is misleading and disceptive and we have a bill pending in Congress which will require the accurate labeling of finished products made of imitation wood and also of genuine wood.

Maple Flooring Association

Through proper publicity and education, we have sold the building public on the use of the lower grades of flooring for many spaces. Otherwise, for instance, only first grade maple would be specified for buildings such as gymnasiums. We have proved to architects and school boards that second grade maple is attractive and wears just as well as the higher grade, and at a savings in cost.

Northern Hemlock and Hardwood Association

Yes, there have have been other situations. The greatest difficulty we have had to overcome is the writing up of building codes that sometimes exclude our northern hemlock. At other times when building codes do accept the material, the specifications are written up in such a way by the architect that hemlock cannot meet the requirements. For the most part, we are being successful in our promotion.

Southern Pine Association

While the cost of lumber to the consuming public has risen only a small fraction compared with most

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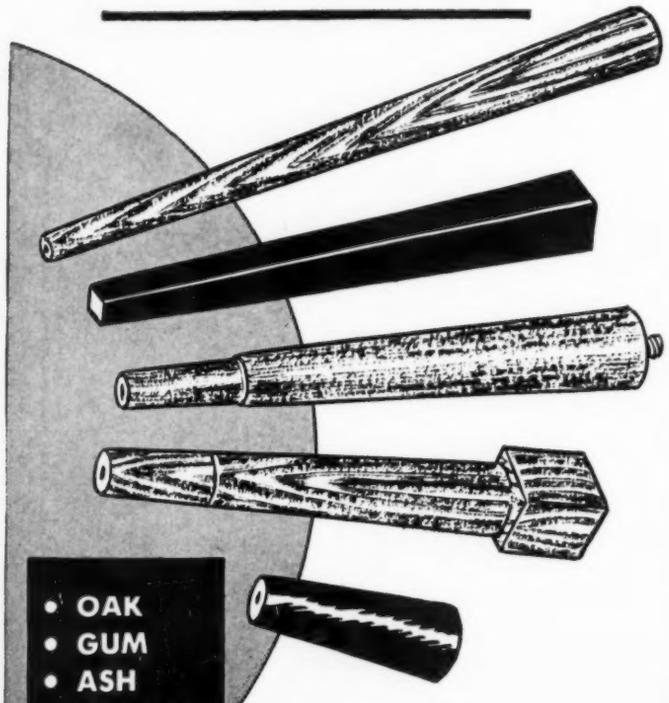

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other building materials, the cost of producing it has increased substantially. The obvious resulting need is for more mechanical efficiency—more economical materials handling equipment. To help stimulate such developments, the Southern Pine Association is conducting a mechanical efficiency program. Many mills have been thoroughly modernized, and we expect to see further acceleration of progress along these lines in the immediate future.

Is your association now doing experimental or research work?

Mr. Romeiser for Walnut

The association is not presently engaged in any research work. We have maintained a close working relationship with the various finish manufacturers. Recently introduced materials which create a bleached effect without the use of bleaching and without pigmented finishes have become increasingly important. In addition, the walnut industry has continued to encourage good forest practices insofar as walnut and hardwoods are concerned and has maintained its cooperative program with about a dozen states in the planting of walnut each year.

Mr. Pratt for California Redwood

Experimentation and research by the California Redwood Association is, basically, in the fields of exterior finishes, seasoning, sawmilling, and quality control.

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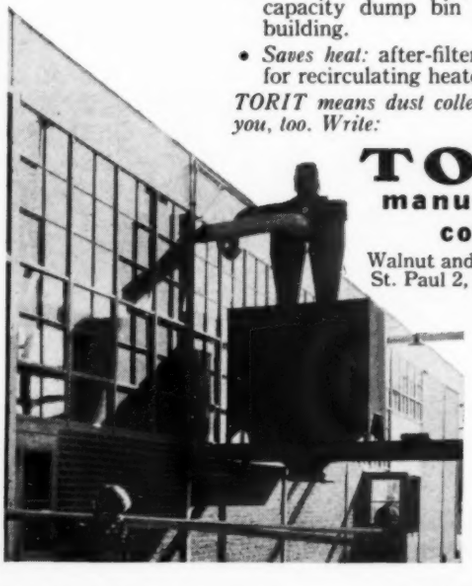

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Mr. Gatewood for Fine Hardwoods

Current research is aimed at developing hardwood surfaces which will have a very high degree of abrasion resistance and impact resistance. Although we have reason to believe that these tests will be successful, it is still a little too early to discuss details. Of course, hardwood surfaces are already able to provide resistance to cigarette burns and damage from liquids.

Mr. Williams for Mahogany

For the past 12 months we have enjoyed the collaboration of the majority of the large finishing firms in developing more than 44 shades and natural textures of so-called decorator brown finishes. The association is actively promoting these as "Contemporary Mahogany with the New Look."

Mr. Clady for Maple Flooring

The association continues its research program with special attention to the cupping of hardwood floors, depth of penetration of floor finishes and the preservative treatment of flooring at the mill.

Mr. McGraw for Northern Hemlock

We are now looking for new markets and are working with the Forest Products Laboratory. Our promotion work is done by direct contact.

Mr. Deas for Southern Pine

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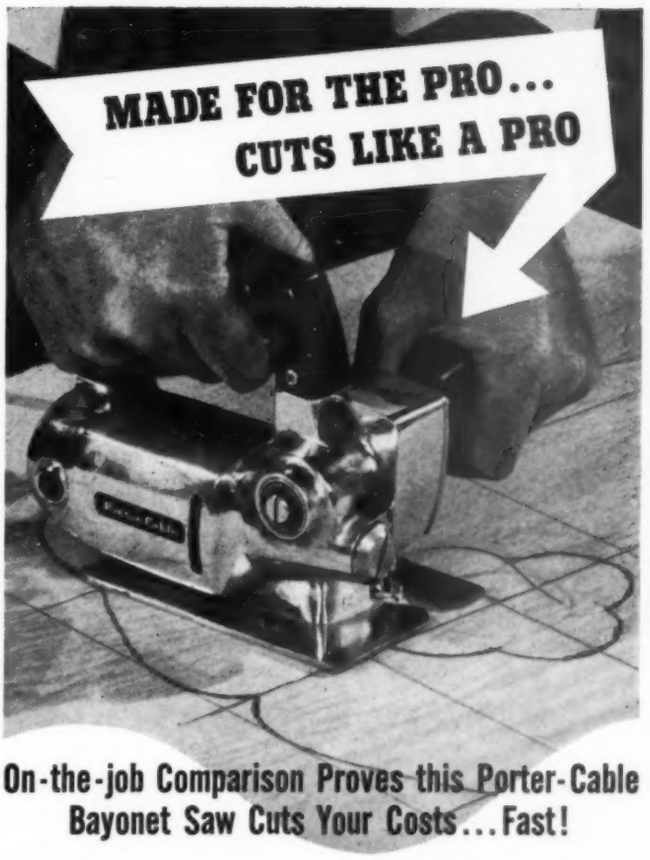

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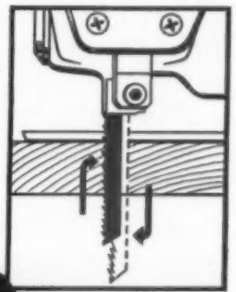
The drawing shows you. Blade moves ahead into the work on the upward cutting stroke. Then it moves back away from the work on the downward relief stroke.



When you see what goes into a Porter-Cable tool, you know why it's your best buy.

Porter-Cable *Quality Power Tools*

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☐ Please rush booklet on No. 548 Bayonet Saw.

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In Canada: write Porter-Cable, Ltd., Box 5019, Ontario
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- Medium 6-roll machine
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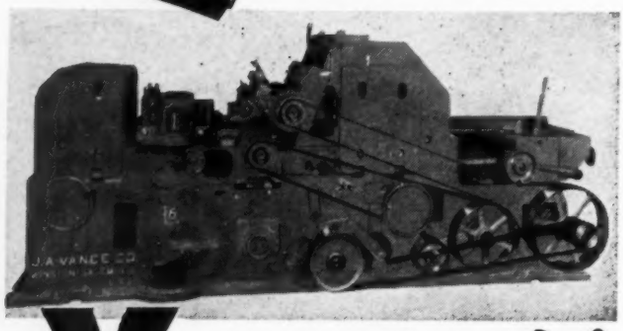

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6-KNIFE CYLINDERS AND SIDE HEADS

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Quality Steamed Bandsawn
WALNUT LUMBER
the Beautiful Bluegrass Kind

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GEORGE E. TOMLINSON COMPANY, Inc.
WINCHESTER 7, KENTUCKY

petition. Three years ago we established our own research committee. In addition, many individual lumber companies have their own research programs.

New patterns, new treatments of paneling and siding have already been introduced. Another development is in the field of laminated products. From over-all standpoint, however, the really important thing is the lumber industry's acute awareness of the research need. This understanding, plus the expressed willingness of individual manufacturers to invest in research projects is the really big hope for the future.

Where can we look for wood's greatest development in the future?

American Walnut Manufacturers Association

The future will probably remain the same for walnut as the important markets of today. Printed grains and other means of artificially reproducing hardwood grains have and probably will continue to make inroads. The industry's most important concern right now is with the proper identification of products so that the public is not taken in by the misleading representation of these products.

Maple Flooring Manufacturers Association

Wood's greatest development in the future will depend on research and the education of the younger generation. Many young people go to schools built with little or no wood, play basketball on synthetic flooring and live in non-wood homes with metal furniture. Others work in large industrial plants built of steel, glass or aluminum, all floored with concrete. These young people will require education along these lines, and it shouldn't be too much of a task to teach them to like the beauty, utility, warmth and friendliness of wood.

Northern Hemlock and Hardwood Manufacturers Association

We sincerely believe that the $1,250,000 per year wood promotion program put on by the National Lumber Manufacturers Association will lead us to one of the greatest wood development programs that has been undertaken in years!

BIRDS EYE VENEER CO.

SINGLE PLY VENEERS · ALL NORTHERN HARDWOODS

ROTARY CUT ····· SLICED ····· HALF ROUND

BeVeG VENEERS

BIRDS EYE · CURLY & PLAIN HARD MAPLE
NORTHERN BROWN ASH · NORTHERN RED OAK
BIRCH · CORK WHITE PINE · BASSWOOD · ELM

P. O. BOX 317

Escanaba, Mich.

Southern Pine Association

As far as the future is concerned, the real challenge lies in the scope of contemplated construction needs. During the 1960's, we should have the biggest home building boom in U.S. history. By intensified research, product improvement and merchandising, lumber should be able to get a fair share of all markets.

California Redwood Association

Redwood's greatest development in the future lies in better understanding of its basic qualities. It will find increased use as furniture cores and in many industrial fields.

Fine Hardwoods Association

We do not look for any particular changes in the percentage of our market furnished by the various types of products. However, expected population growth and growth in disposable income will certainly combine to greatly increase the traditional markets for hardwood veneer. The J. Walter Thompson Co. estimates that household furniture sales can increase by 85% within the next 10 years. However, the hardwood veneer industry recognizes that our share of these markets will be determined by how well we measure up in merchandising ability and product improvement. We intend to measure up!

Mahogany Association

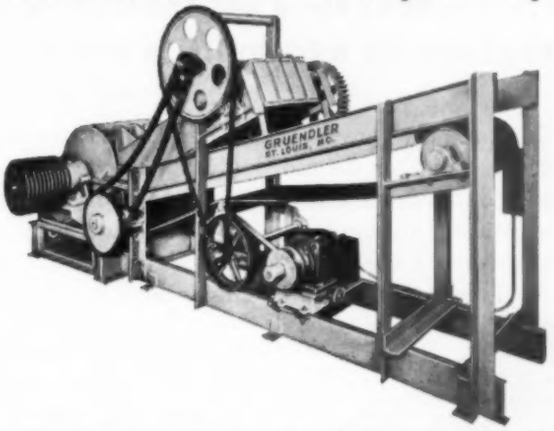
Mahogany's greatest development in the future should be in all types of wood furniture which has an enormous potential with the country's growth.

SINCE 1885—GRUENDLER QUALITY THE BEST THAT MONEY CAN BUY

Another New Gruendler Unit

CHIPPER WITH FORCE FEED TABLE

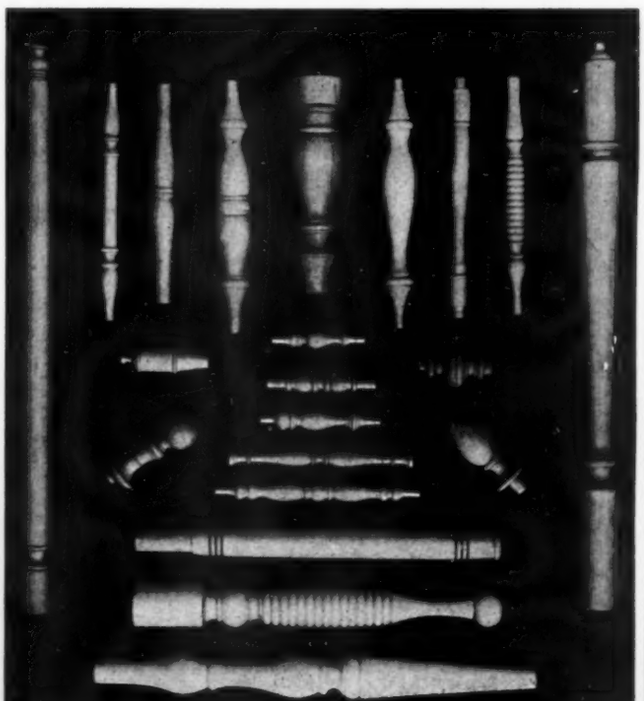
For the conversion of wet or dry wood wastes, slabs, sticks, short ends and scrap into chips.



The chip sizes produced in volume are utilized for poultry litter, animal bedding or fuel. The Unit is ideal for the primary preparation of chips for rechipping into finer finish sizes or for feed sizes to fine grinders for use in the manufacture of board, chip board, hard pressed wall boards and other by-products. Gruendler Wood Waste Conversion Equipment, famous for over 40 years. Write for Bulletin 900 and also mention the nature, size of wastes and the fineness and volume desired.

GRUENDLER CRUSHER and PULVERIZER CO.

Dept. WW-1158, 2915 N. Market St. St. Louis 6, Mo.



H.G. WINTER & SONS, INC.

KINGFIELD, MAINE

Established 1885

FASTER • TOUGHER • TROUBLE FREE!

SUPREME BAND SAWS

SUPREME BAND SAWS cut faster . . . have increased cutting capacity with minimum breakage! Present day high speed equipment demands Supreme Saws. Free from kinks and imperfections. Made from the finest Special Nickel Alloy Steels, tempered for toughness . . . to stay sharp! There is a Supreme Band Saw for every industry . . . for every material. Special purpose saws are made to order.

Quick Service
REPAIR & RENEW
CARBIDE-TIPPED
CUTTERS

SEND US YOUR CARBIDE-TIPPED KNIVES, CUTTERS, ROUTER BITS

We will promptly repair, retip and sharpen your Carbide-Tipped tools and get them back to you without delay. Skilled workmen and precision equipment insure fast service and complete satisfaction in restoring cutting efficiency.

PROMPT . . . DEPENDABLE SERVICE

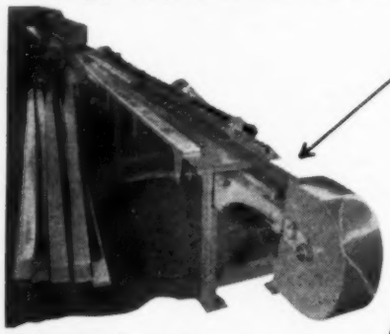
THE SAW & KNIFE SPECIALTY CO., INC.

6526 CARNEGIE AVENUE • CLEVELAND 3, OHIO

THE LINDERMAN AUTOMATIC WOOD FABRICATOR WITH PNEUMATIC STRAIGHTENING DEVICE

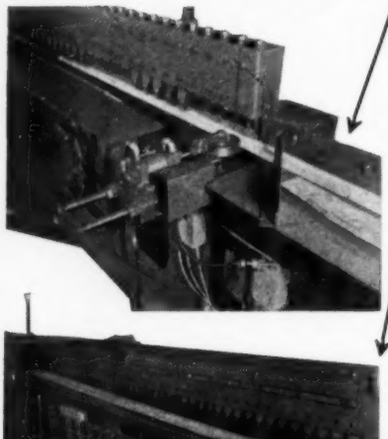
engineered and built to handle 1"x3" and 1"x4" sound-edged lumber up to 16-ft. in length.

You can now convert your 3" and 4" widths into 6" and 8" widths by means of the "Linderman Process" which will take the narrow lumber up to 16-ft. in length, straighten, dovetail joint, glue and assemble in one continuous operation. The two boards welded together with the "Double Taper Dovetail Glue Joint" is actually stronger and straighter than regular width lumber. It is also accepted for all building construction by various departments of The Government, and for all kinds of ammunition cases and pallets for shipping projectiles. This is how it's done.



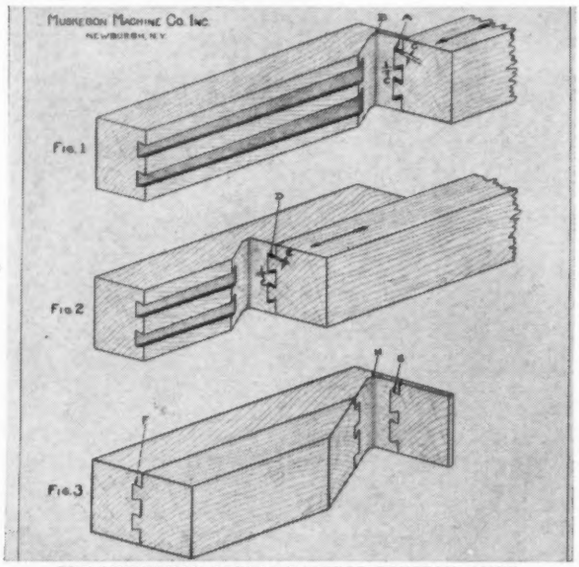
No. 1. Boards with sound edges, which may have a depth of edge curve up to 2", are fed into the Linderman Machine from each end and automatically straightened before the dovetail joint is cut.

No. 2. Straightening is accomplished by the action of a movable roller which exerts a pressure of several hundred pounds against the edge of the stock and is actuated by an air cylinder. Positive control of the straightening is assured by means of electric eye equipment.



No. 3. After the dovetailing operation and application of glue, the two narrow boards are assembled in the center portion of the Machine and the finished assembly is automatically ejected for removal by the center Operator.

No. 4. The outstanding success of the "Linderman Process" is based on the Double-tapered Dovetail Joint which is so constructed that it actually forces glue into the wood pores to produce a "weld." The resulting boards are STRONG and STRAIGHT and cannot come apart.



THE LINDERMAN DOUBLE-TAPERED DOVETAIL JOINT
(DOUBLE TONGUE AND GROOVE) AND HOW IT WORKS

Fig. 1 Shows small end of tongue entering large end of groove of "A" (section of grooved piece of lumber cut out at "B" for clarity). Note wide clearance at "C" between sides of tongue and sides of groove.

Fig. 2 Tongue has now moved to "D" half the length of groove. Note that clearance "E" between sides of tongue and sides of groove is now half of "C" in Fig. 1.

Fig. 3 Tongue has now moved full length of groove to "F". Note that small end of tongue now fits small end of groove tightly as at "F" and large end of tongue fits large end of groove tightly as of "G". Both pieces of lumber are shown cut away as at "H" in order to show fit of large end of tongue and groove clearly.

PRODUCTION: With only four men needed for operation the Machine will produce from 15,000 to 20,000 board feet per day.

MUSKEGON MACHINE CO., Inc.

NEWBURGH, NEW YORK

Yesterday's Progress . . . Today's Reality

Here is a pictorial history of woodworking machinery. The material has been organized according to plant operations: rough mill, machining, sanding, drying, assembly and fastening, plywood machinery and miscellaneous operation.

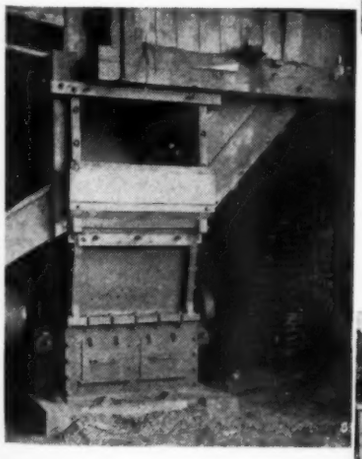
The early model of a machine appears first and then its modern counterpart. In addition to furnishing pictures, manufacturers have included features of the early machinery in contrast to specifications and performance of the new.

This history is not inclusive, but it does highlight the tremendous advancement of our industry. Many current operations and pieces of equipment have been omitted because there is no old model to show in contrast.

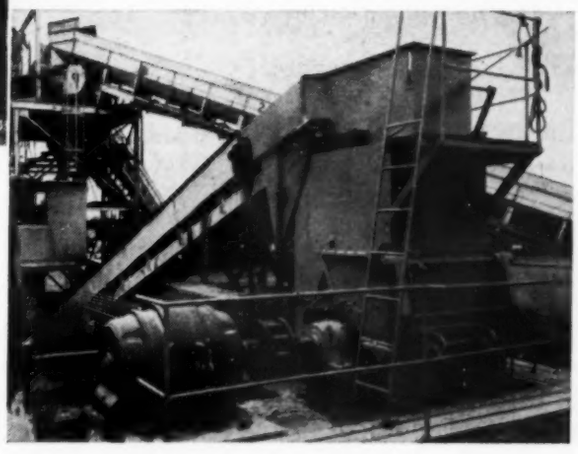
◄ *Visitors to the 1905 World's Fair stepped inside a rustic booth which featured cutoff saws by Irvington Machine Works. Today their descendants may be using the modern counterpart, the No. 26-M over-cutting cutoff saw. Illustration shows the No. 26-M in use at Nicolai Door Company. This machine has a foot switch control which permits the operator to use both hands for feeding material. Diam. of saws is 16", 18", 20", 22" or 24", with h.p. of the saw motor 3 — 7½ h.p.; and speed of stroke is 84 strokes per minute.*

Cutoff Saw Featured at 1905 World's Fair, Portland, Oregon

Rough Mill Operations



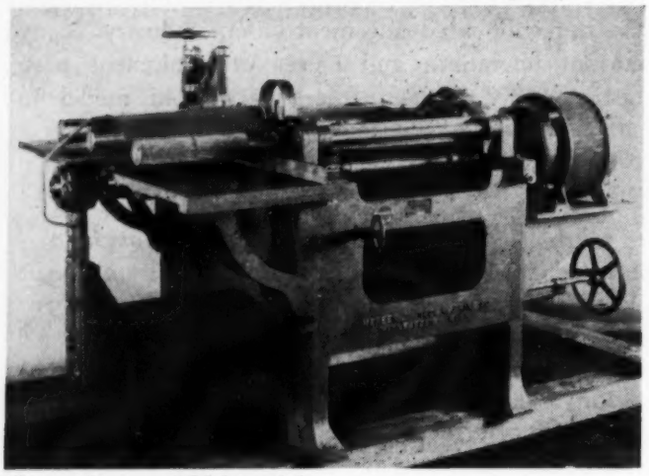
◄ *The wood waste in many woodworking plants is sufficient fuel for the boilers. The problem is to convey and feed the scrap wood efficiently. The Jeffrey Manufacturing Co., Columbus, Ohio, has been helping the industry do this for many years. Shown here is an early shredder which was in operation at Kingsport, Tenn., in 1916 The second photograph illustrates a modern wood hog bark shredder in operation at a Texas plant.*



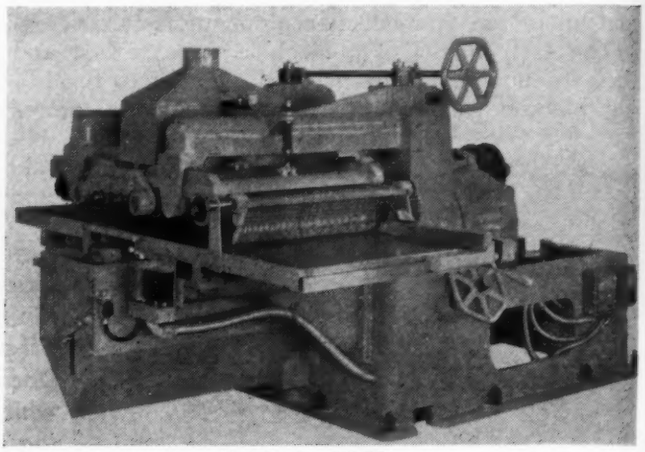
Hogs Help Feed Boilers

MACHINING WOOD: FROM RIPPING TO SANDING

Mereen-Johnson Introduces New Gang Rip Saw



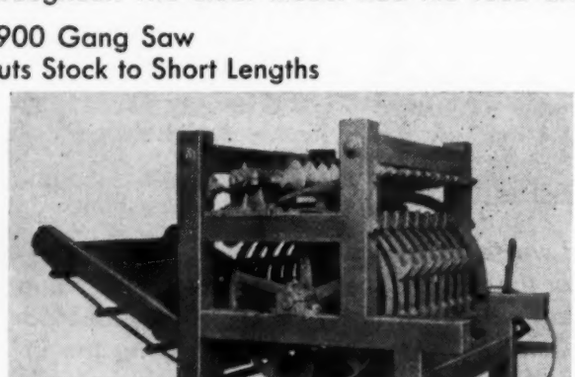
Gang rip saw, 1926 model.



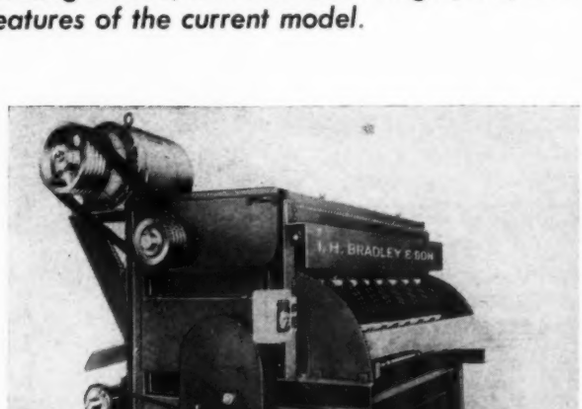
Gang rip saw available in 1958.

It was 1926 when the Mereen-Johnson Machine Co. introduced the No. 441 gang rip saw. The original machine was fitted with a stationary arbor: the arbor unit did not raise and lower for adjustment of the saws relative to the work or for bed plate cutting. Today's machine is completely adjustable. The old machine had babbit bearing feed rolls: the new is anti-friction bearing throughout. The older model had the feed drive taken from a countershaft arrangement off of the arbor: the modern counterpart has a separate feed motor drive with infinite speed variations. The first gang rip saw had six driven feed rolls or relatively small diameter; the new model has eight large diameter feed rolls with an option for ten, all driven. A one piece case base, built-in leveling screws, anti-kick-back finger, etc, are all features of the current model.

1900 Gang Saw
Cuts Stock to Short Lengths



Multi-cut gang saw used in 1900.



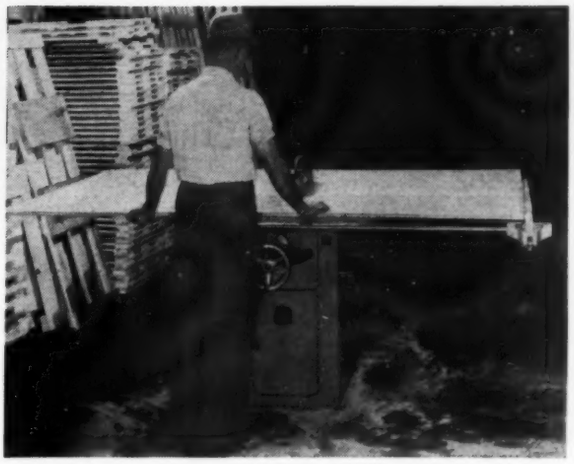
Today's saw cuts three times as much per hour.

About 1900 the I. H. Bradley Company advertised the multi-cut gang saw as a "machine of extraordinary benefit to manufacturers cutting stock into short lengths in large quantities." Today's "Bradley Wood Sawing Giant" cuts better than 43,200 pieces per hour! The old saw handled stock "as fast as a boy can feed it, making them (stock) all one length." (Approx. 12,000 per hour.) There were eight saws which could be slipped off easily; a weighted lever, which was adjustable, held the work in place. The frame was of rock maple.

The early machine handled stock 2½" thick, 32" long: today's model takes the same or different lengths of stock up to 28" long. All metal construction is used in the '58 model with direct motor or V belt drives.

Boice-Crane Celebrates With New Machines

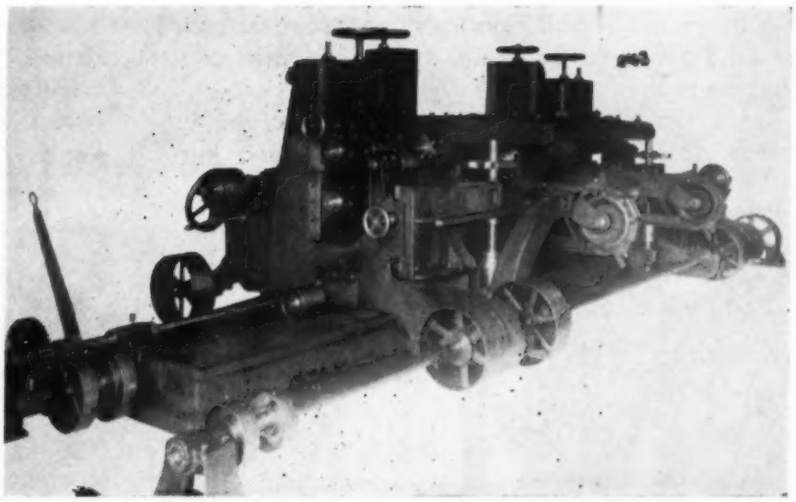
◄ *Boice-Crane Company, who celebrates 50 years in business in 1960, illustrates saw development with these two pictures. The first picture shows a pioneer model of what is now known as the "Monomaster." The pioneer model boasted ¼ h.p. drive contrasted with 2 h.p. drive in today's machine. The early machine ripped boards up to 5½" wide, but today one model of the Monomaster will rip down the center of an 8' wide plywood panel. First major improvement to the machine was a tilting-table feature which permitted an angular cut of 10°. This became the first small tilt-table saw, later followed in the early 30's by another Boice-Crane innovation—the first bench-type tilting arbor saw driven by belt and "rolling" or sliding pulley—a table saw drive still widely used.*



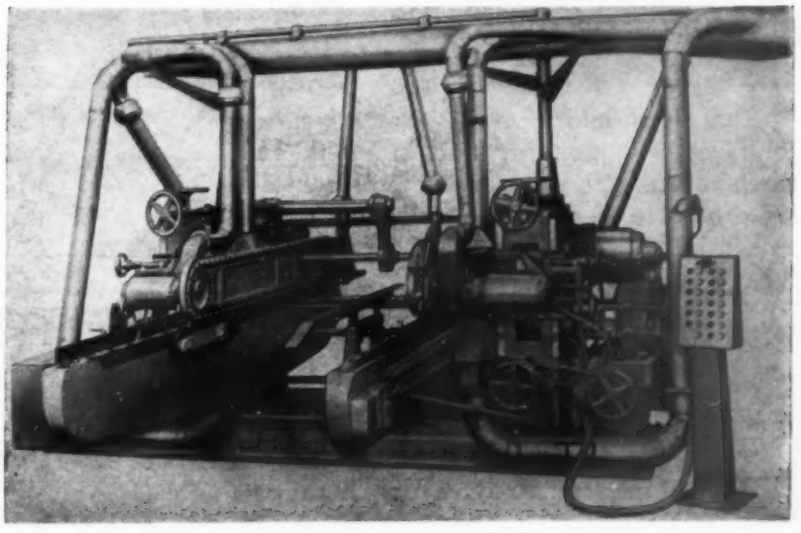
Greenlee's Early Tenoners Designed for Railroad Car Shops

In 1900 Greenlee Brothers & Co. produced their first double-end tenoner, the No. 540. These first Greenlee double-end tenoners were primarily designed for use in Railroad car shops. Today Greenlee is one of the very few producers of equipment for the railroads—machines for trimming, adzing, boring, branding and incising railroad cross ties. The forerunner of the modern No. 545 double-end tenoner was first produced in 1926. It incorporated many refinements which became standard features for double-end tenoner design: stationary right hand housing; complete control of machine from operator's normal right-hand position; easily dialed settings calibrated for accuracy were new to the woodworking field; and tilting feature for all spindles.

On today's machine all motors are totally enclosed; normal speeds are 3600 r.p.m.; a pushbutton station permits flexible location; a dial arrangement will make accurate settings to within a fraction of 1/62"; and jump or stationary type dado attachments will provide facilities for cutting any reasonably-spaced groove between the pressure beams, and grooves up to 1¼" in width outside the beams. These are only a few of the outstanding features.



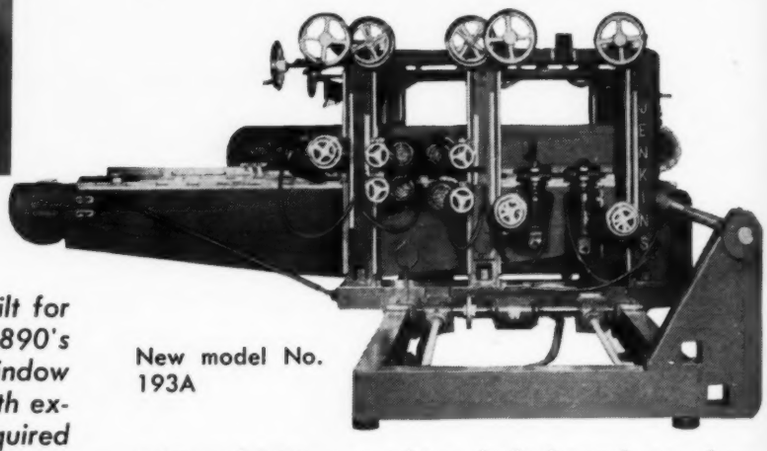
Above: Early model and below today's double-end tenoner.



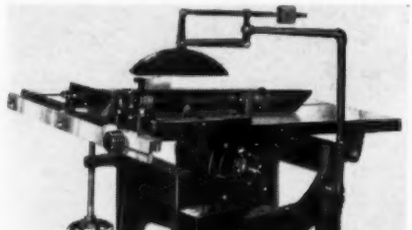
Jenkins Builds Machine for
Sash and Furniture Manufacturers

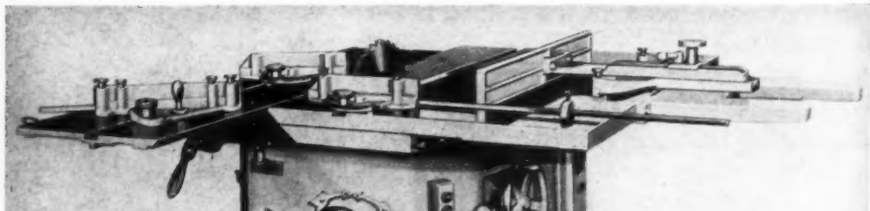
The early Jenkins-Hayes No. 85 was built for sash and furniture manufacturers of the 1890's and 1900's. Check rails, stiles, door and window rails and furniture parts were turned out with extreme accuracy. Sash and frame parts required very little angular cutting and as a result belt driven cope spindles, tenon heads, saws, and feed chain drives were used with belt take-offs and overhead countershafts. Spindle speeds of about 3000 r.p.m., babbit bearings, and feed speeds of 18 f.p.m. and 28 f.p.m. made it a good production tool.

In 1956, Jenkins introduced the first of its newly designed 190 series of double end machines. These important basic design features were among the improvements made on this series: three times more room between tool stands for easier setup; saws and copes tilt 90° up or down and cut any angle from top to bottom of stock; 46" ways on each tool stand for full vertical adjustment of each arbor slide, replacing the short 14" and 16" ways; drive shaft through rear base to eliminate vibration of old cantilever type bracket at rear. Other features were dual traversing screws 36" apart for perfect alignment of traversing beam, replacing the single traverse screw; and infinitely variable feed chain speed drive which eliminates problems of limited four speed selection. Machines manufactured by Kohler-Joa Corp.



New model No.
193A





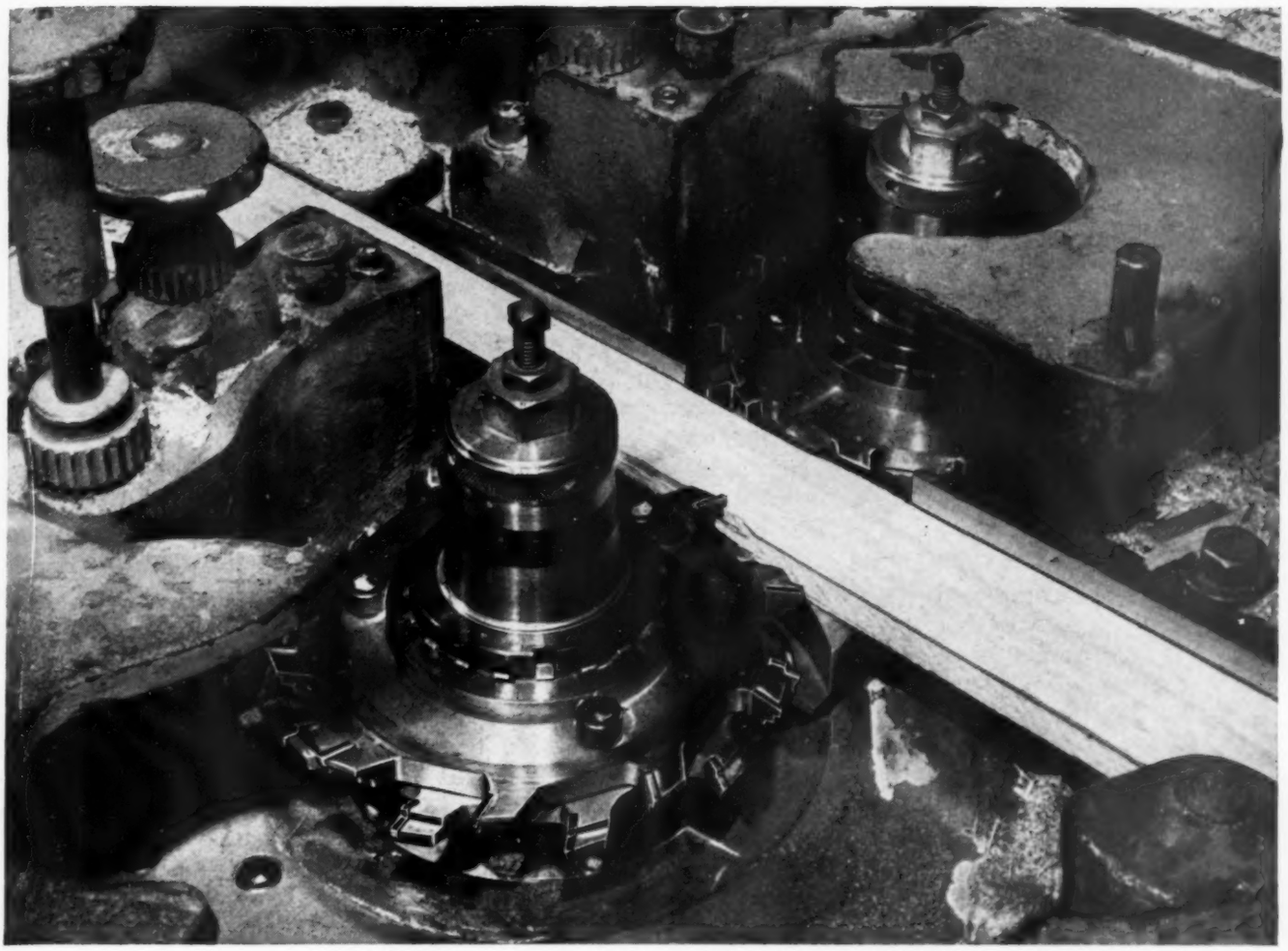
The Northfield model 2-M combination saw was first manufactured in 1920. This machine was a forerunner to the present tilting arbor No. 4 saw. The picture shows the tilting arbor saw with a rolling table. The 2-M non-tilting arbor saw made bevel angles when the fence was tilted. There was no dust disposal system. Modern counterpart at right.

BIRCH DOOR PANELS

⅛" ALL BIRCH CONSTRUCTION
IN DOOR SIZES ONLY.

BELLERIVE VENEER & PLYWOODS, LTD.

Mont-Laurier, Prov. Que., Canada **Phone 158**



Yates A-23 flooring machine has Carboloy carbide cutters, cuts 12,000,000 feet of oak and hard maple annually.

In cutting hardwood flooring at Cotton-Hanlon, Inc.

CARBOLOY® CARBIDE CUTTERS SAVE $1,200 A YEAR ... CUT TONGUES AND GROOVES MORE ACCURATELY

Replacing high-speed steel with Carboloy carbide cutters on a Yates A-23 hardwood flooring machine resulted in a double saving at Cotton-Hanlon. Annual maintenance savings amount to over $700, and the long wearing Carboloy carbide units reduce cutter costs by approximately $500.

Twice daily sharpening – necessary with steel cutters – has been eliminated. Carboloy carbide cutters need sharpening only once in two months to keep them in top condition. And these carbide units have a service life of three years . . . outlast 9 sets of steel cutters.

The high-speed steel cutters used previously wore so fast that the tongue and groove patterns had to be watched closely. Grooves tended to become narrower and the tongue cuts broader as the cutting hours mounted up. But the new carbide cutters are so hard that the flooring cut is consistent without frequent adjustment in the cutter set.

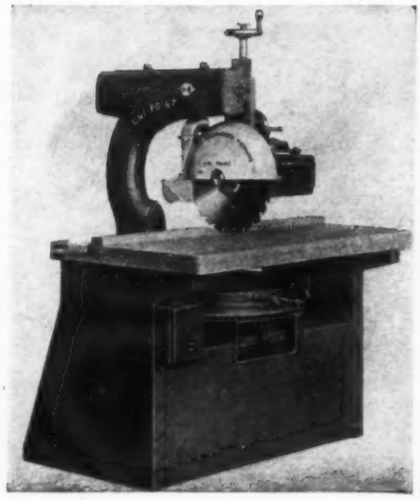
Carboloy carbide knives, in sizes up to 50", deliver similar performance on jointers, sidematchers, and other types of woodworking equipment. For more money-saving information, write: *Metallurgical Products Department of General Electric Company, 11128 E. 8 Mile Road, Detroit 32, Michigan.*

CARBOLOY®
CEMENTED CARBIDES

GENERAL ELECTRIC

New Approach—Operator's Needs

Many years ago, when engineers were assigned to develop a radial saw, a new approach to the machine operator's need was the theme of the research. This research was undertaken by the American Woodworking Machinery Co., an outgrowth of the American Saw Mill Machinery Co., where, formerly, the firm was the Woodworking Machinery Division, and where that firm served the woodworking industry since 1903.



The design which was thus created developed the engineering principle of a turntable underneath the wooden work table, and on this turntable was mounted a column with a quadrant or rocker-way so the column could be tilted. Thus, by swivelling the turntable, the saw blade above turned to the right or left at the same identical point and a large graduated scale and pointer on the base ring permitted the operator to easily observe the exact degree of angle desired. By combining the swivelling and tilting mechanism, the saw blade could be set at any desired compound miter angle. Thus, a machine was designed by which the saw blade always cut at the same point and in this way the name Uni-point (one point) was born. Throughout the years, this same principle has been retained but many other features and improvements have been developed.

The Market's Top 10'' Saw

The Boice-Crane MONOMASTER

Now only

$263.30*

The same powerful, precision saw regularly priced at $315.00!

Oversize trunnion. Guaranteed precision at the cut. Cuts 3¼" hardwood as slick as a costly 5 H.P. 12" saw. SINGLE blade positioning control on the front. Saves time. Prevents accidents. Up to 44% more ripping capacity with standard equipment. 5% to 29% faster blade speed. Blade tilts left—safer for right-handed operators. Steel, all-purpose insert serves saw blades and dado heads without interchange. Ground cast-iron fence.

*Basic unit. Motor options up to 2 H.P., switch, extensions, guard extra, but priced for further savings.

Write for free catalog and prices.

BOICE - CRANE COMPANY

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Newman Builds First Planer-Matcher in 1912

In 1912, Newman Machine Company designed and built its first large planer and matcher, the No. 97, in two sizes, 16" x 8" and 24" x 8". This 6-roll double cylinder machine was made to match or joint from 2" to full width and plane anything down to ¼" thick. The matcher

(Description of Newman equipment continued on next page.)

Cut Saw Costs!

Eliminate expensive "outside" sharpening . . . or time-costly "hand-sharpening" . . . of Band Saws and Circular Woodcutting Rip Saws or Nonferrous Metalcutting Saws. Rugged Black Diamond units grind or file quickly and accurately! Any low-salaried, inexperienced man (or woman) can produce perfect cutting edges on every tooth, every time! Keep all your saws sharp, with less saw inventory!

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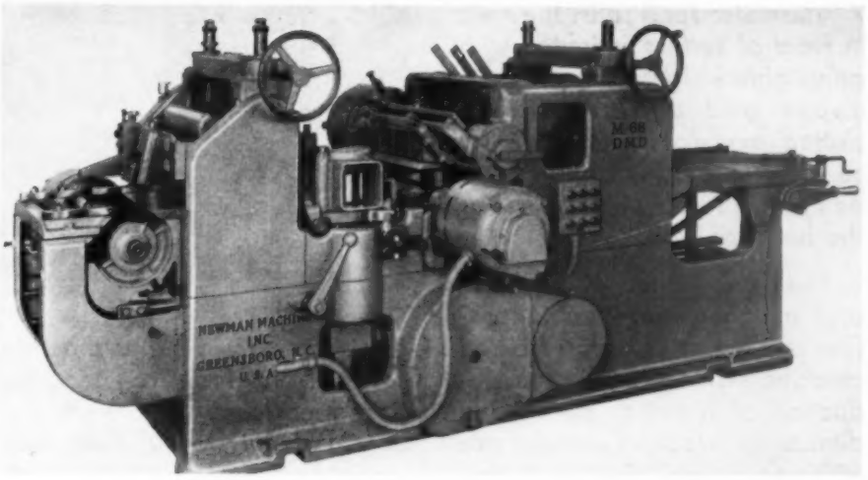
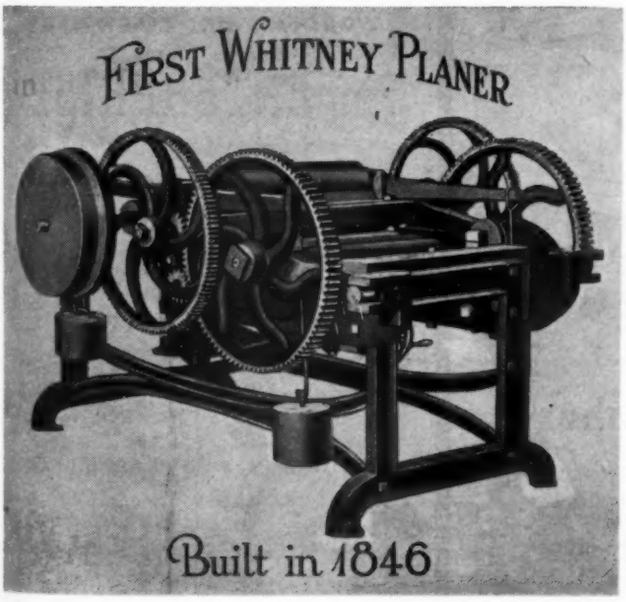
spindles were "large in diameter and run in long self-oiling bearings. The feed regulated by means of tight and loose pulleys. . . . Three rates of feed regularly furnished, but any desired rate furnished when ordered." Four knife round cylinders were furnished as extras.

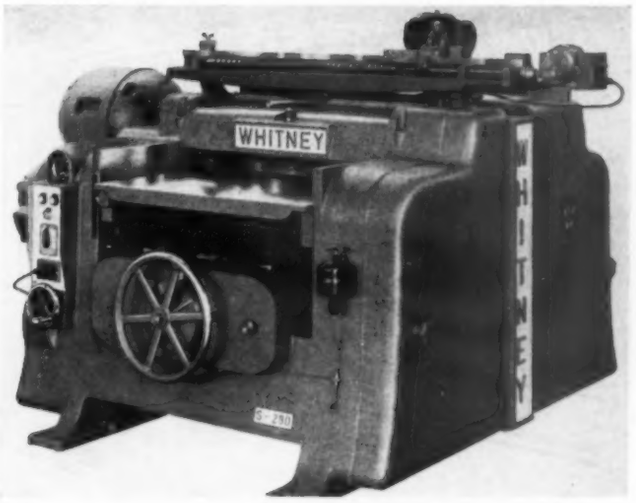
The modern M-68 six-roll Newman motorized planer and matcher equipped with 6-knife round cylinders and simultaneous roll raising device for bottom infeed rolls sharply contrasts with the old. The new machine is 100% ball and roller bearing equipped. All cylinders, spindles and heads are dymetrically balanced. Three separate feed pulleys are furnished for speeds up to 150 f.p.m.



Search For Practical Planer Began 121 Years Ago

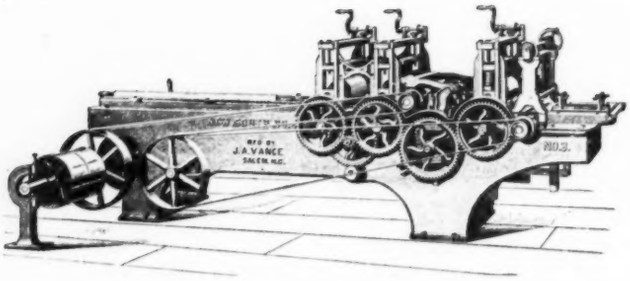


Back in 1837 the goal of young Baxter D. Whitney was to build a more practical cylinder planing machine. The first commercially built Whitney planing machine was constructed in 1846, built in about six weeks and sold to Messrs. Murdock & Fairbanks of Winchendon. The machine was a practical success and, in spite of its outsized spur gears and spidery looking frame, incorporated some principles used in planers turned out by the firm today.

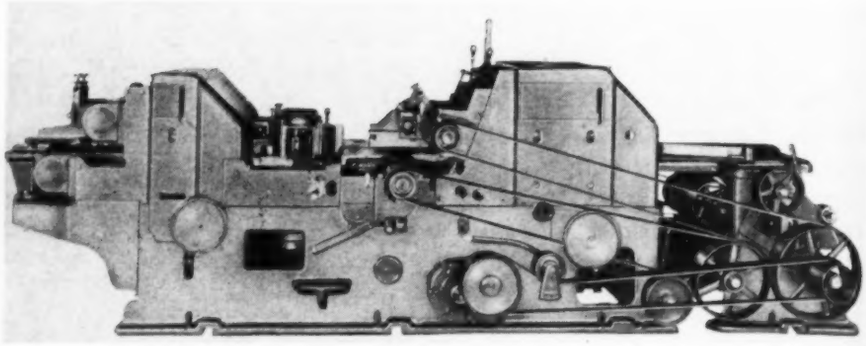


The new Whitney S-290 motorized single surface planer was first introduced in January, 1957. It is built in three widths, 36", 40" and 44" and will dress stock 8" thick and as short as 14" not butted, or 3" when butted. A sectional top infeed roll and sectional chipbreaker are standard equipment. Feed rates are continuously variable up to 90 f.p.m. by a built-in unit. The heavy box-section frame is designed for rigidity and strength to handle anything from 1/16" to 8" thicknesses.

Vance Flooring Machine
Forerunner of Planer-Matcher



A description of this early 1890 Vance machine read: "This is one of my latest improved flooring machines made to meet the wants of rapid working mill men. Very heavy; has six 7" diameter feed rolls; the rolls in front of cutters weighted with adjustable weights to each; both upper and under cylinder slotted, made of hammered steel so you can use any kind of knife on cylinders; self-oiling boxes of the best Babbit."



The new Vance M-6 planer and matcher with double profiler is a heavy cast iron framed machine especially built for production of flooring, siding and dimension stock. Controls are within easy reach. Feed is started or stopped from either the side or the front. Front rolls can be raised or lowered to vary the depth of cut, lower front rolls vertically adjustable to conform with front bed plate. There are 4 infeed rolls and 2 outfeed rolls, all 10" diameter, providing 100, 150 and 200 f.p.m. as standard.

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The Leitelt Power Transfer Car, operated by one man, can move load after load of lumber at lowest operating cost to you. It will move your kiln loads of lumber dependably and efficiently in and out of storage tracks . . . charge and discharge your dry-kilns and deliver loads to your first line machine. Extra manpower is eliminated. Leitelt will gladly answer inquiries on how a Leitelt Transfer Car can serve your particular needs.

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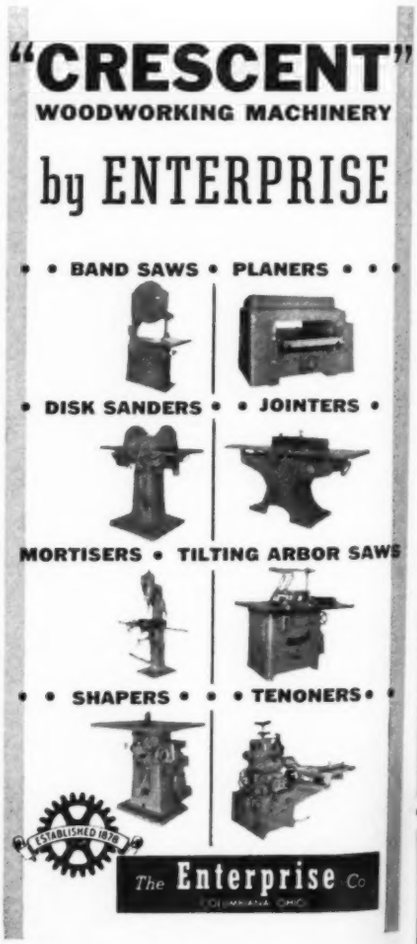
WOODWORKING MACHINERY
by ENTERPRISE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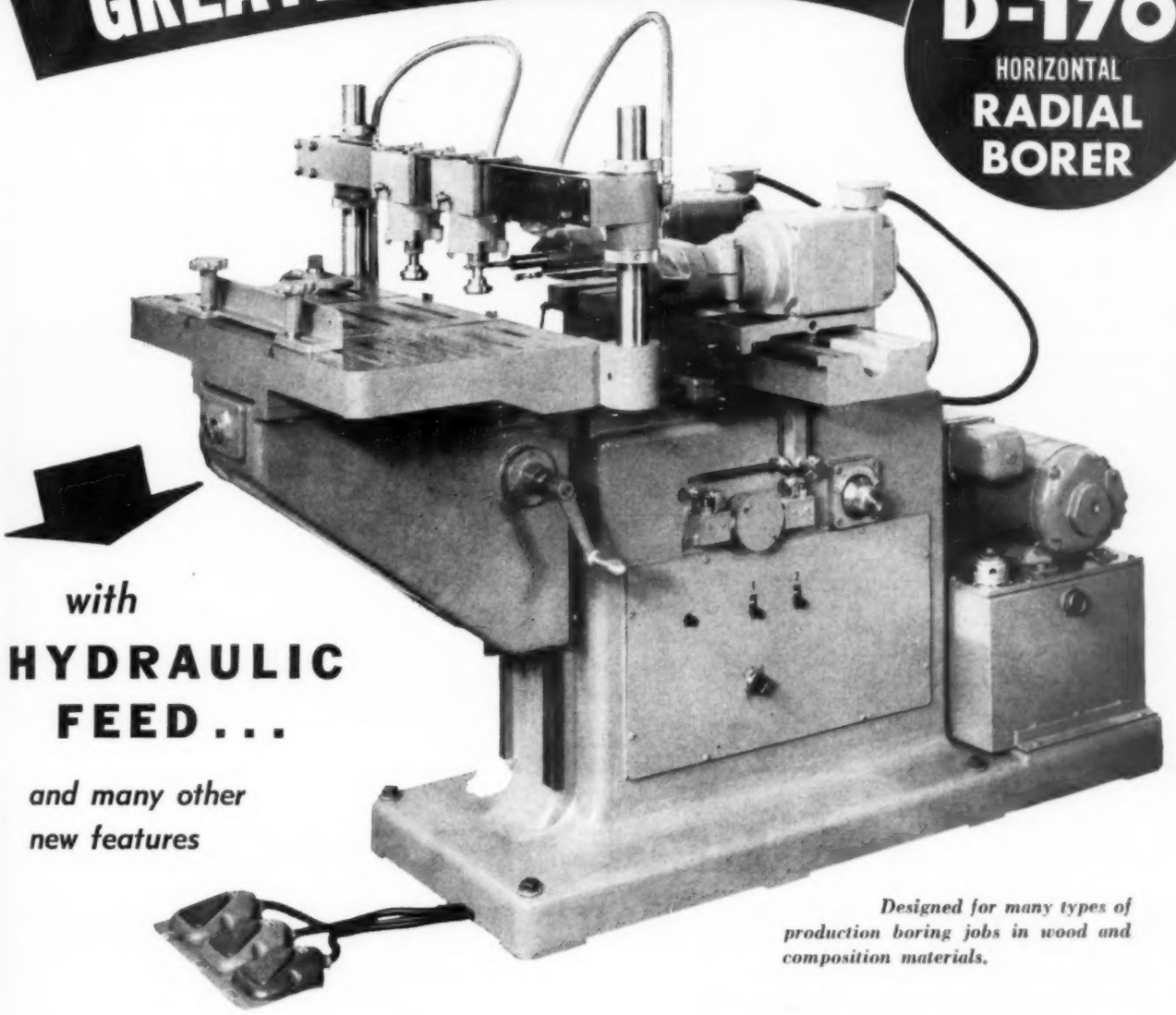
GREATER VERSATILITY

ROOT D-170 HORIZONTAL RADIAL BORER



with

HYDRAULIC FEED . . .

and many other new features

Designed for many types of production boring jobs in wood and composition materials.

The new D-170 Radial Borer, with its many new and improved features, provides greatly increased productive capacity and versatility over all other similar type machines.

Its unique hydraulic feed system may be set for either automatic continuous or intermittent operation, with overloading prevented by an automatic safety valve. Through use of the conveniently positioned foot pedal controls the spindles may be stopped or reversed at any point of the feed stroke—a feature that cuts setting-up time and provides for greater safety in operation. A simple control valve permits instant adjustment of feed speed.

The D-170 is available with spindle spreads from 1" minimum to either 30" or 42" maximum, and vertically from 1" to 5¼", with each spindle quickly adjustable for in-line or offset boring. The table has an 8" vertical adjustment.

The machine is especially adaptable to many types of multiple boring heads which greatly increases its hole pattern capabilities. It is also equipped with clamping and chip blowing devices that work automatically with each stroke.

- **Write today for Bulletin 204 giving complete data on the D-170—no obligation.**

Built by

Boring Machinery Specialists

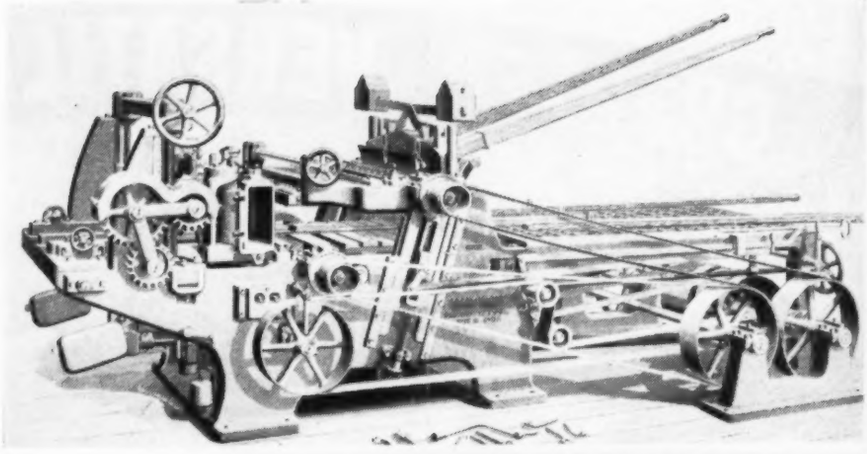
B. M. ROOT CO.

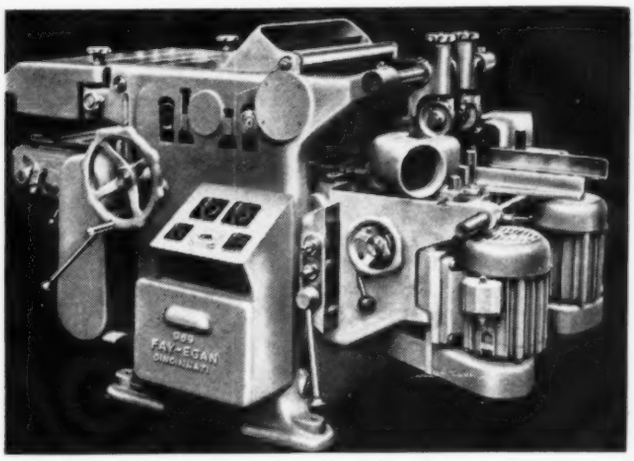
YORK, PENNSYLVANIA

Planer-Matcher History
at Fay & Egan

Illustration of Fay & Egan planer-matcher manufactured under their patent of December 1889, displays a confusing network of flat belting, projecting levers, handwheels, exposed spur gears and pulleys, and separately mounted components.

The current model No. 969 planer-matcher-molder sharply contrasts with old in its modern appearance and functions. The new machine performs almost any job that can be done to four sides of lumber in one operation. All types of single and double surfacing, flooring, sheeting, ship lapping, church seats, coffin work, moldings of all kinds are routine. Cylinder and matcher spindles operate in ball bearings at 5,000 r.p.m. Motors are ball bearing, fan cooled and totally enclosed.



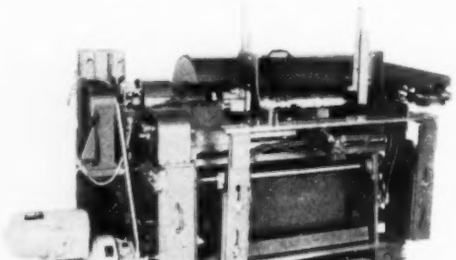


Fay-Egan modern machine is sharp contrast to 60-year-old-matcher.

BRADLEY

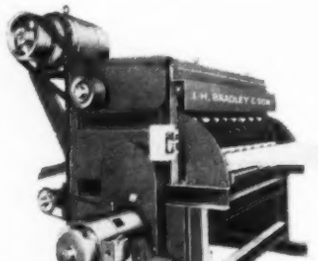
A SYMBOL OF LEADERSHIP IN WOODWORKING MACHINERY SINCE 1882!

Whenever a BRADLEY has been called upon to solve a wood-turning or sawing problem, it has not only solved it, but set high production records . . . saving man and machine hours! BRADLEY experience pays off in efficiency and "know how" to build machines that are ahead of their times.



BRADLEY No. 424-30 FULLY AUTO-MATIC TURNING LATHE

This high precision lathe turns different shapes in pieces up to 30", in One Operation; leaving them so smooth, little sanding is needed. Unique operational features permit changing speeds from 50 to 600 pieces per hour, without stopping the machine. It has power driven spindles; air operated steady rest; an arbor brake that stops operation in seconds; New Bradley Cutter and Cutter Heads and is the most rigid, safest machine of its kind.



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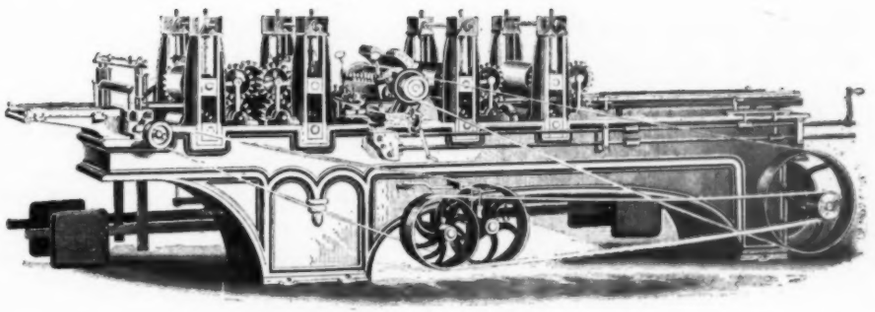
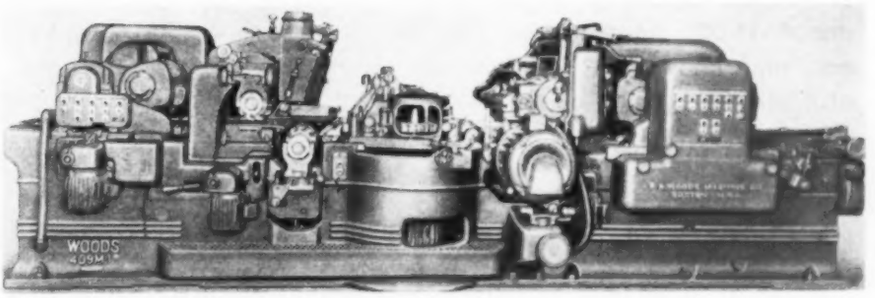
Water Wheel Early Source of Power for Woods Machine

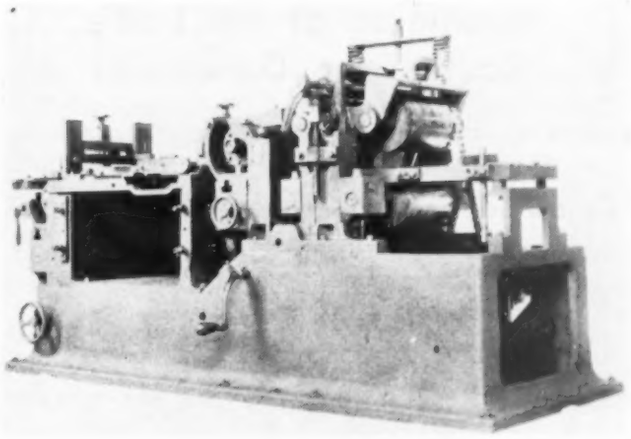




In 1852, Solomon A. Woods proudly exhibited his first machine. It had feed rolls and cutting units that were mounted on a wooden frame and base, using two-winged side heads. The total weight was around 1000 lbs., and the usual source of power came from a water wheel. As steam became a prevalent source of power, machines were revised to cope with problems of flexibility, vibration and strength. Higher speeds produced lubrication problems and led to new patents on self-oiling boxes.

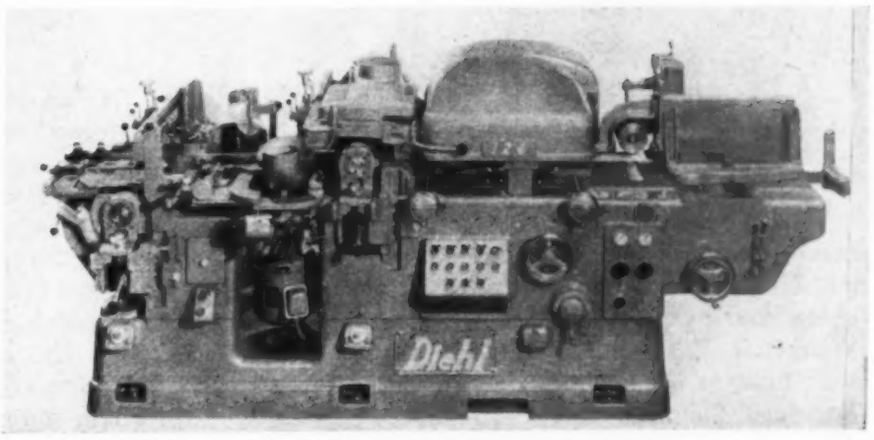
The new Woods 409 series planer and matcher represents a culmination of many long range objectives. These machines, weighing from 42,700 lbs. to 47,200 lbs., attain production feeds up to 1000 f.p.m. through a rugged, continuous frame construction of stress relieved semi-steel. All gears and drive chains are lubricated by forced feed hydraulic lubricator. All ball and roller bearings are enclosed in dustproof housings. Grease lubricants are used for roll bearings. Regulated wick oil feeders lubricate all cutting units. Standard, full taped motors supplied range from 30 h.p. for the back sidehead to 60 h.p. for feed to 125 h.p. for the top head.

Molder History at Diehl



The evolution of the modern day Diehl molder starts with an early Eaglesfield machine which appeared to have been rather awkwardly designed and built by methods typical of job shop block and plate construction. The original company sold out to the Vonnegut Moulder Corporation of Indianapolis. The Vonnegut Moulder was sold to the G. M. Diehl Machine Works, Inc., in 1948.

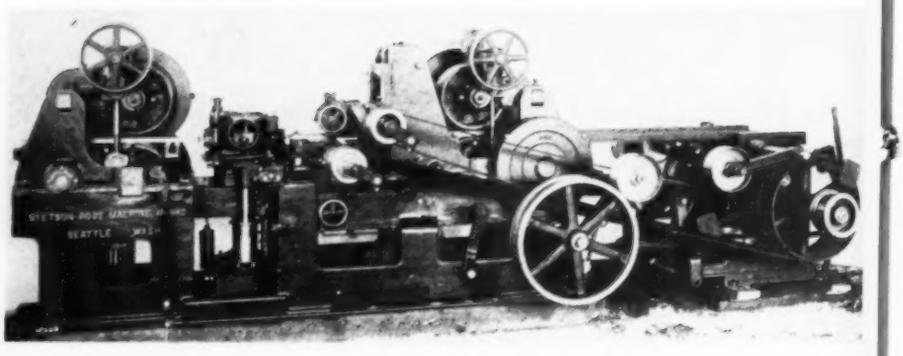
The all-new Diehl molder was announced in 1957. Diehl offers this machine in Models 124, 804 and 604 with 12", 8" and 6" sizes. Each is available in 4 cutterhead models. Those with 5 cutterheads may be arranged with either 2 on top or 2 on bottom. These are heavy, rigid machines for high-speed continuous operation.

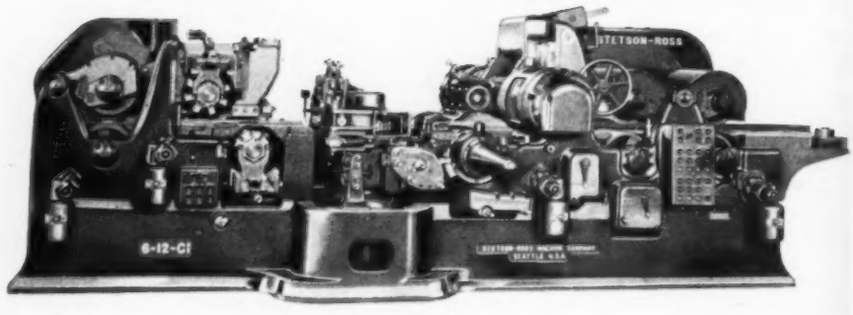


Planing
Operations
Continued

George Stetson and Harry Ross Build New Machine

It was in October of 1900 that a patent was granted on George W. Stetson's Ready Sizer to plane one edge and side of random width stock. Harry B. Ross, who demonstrated the benefits of honing or jointing cutterhead knives in place in about 1903, consolidated his skill and knowledge with that of Stetson's in 1907. Top view shows the first 4-roll Stetson-Ross matcher dating about 1909, two years after the pair joined hand and brain power.

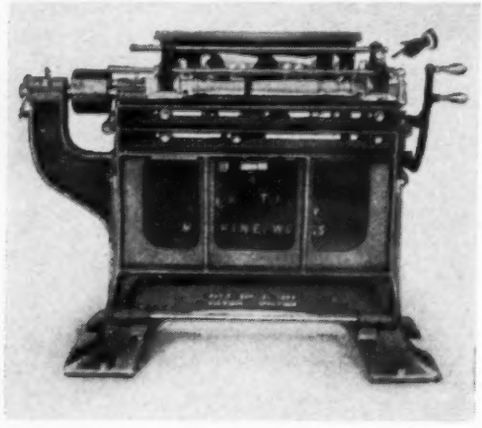




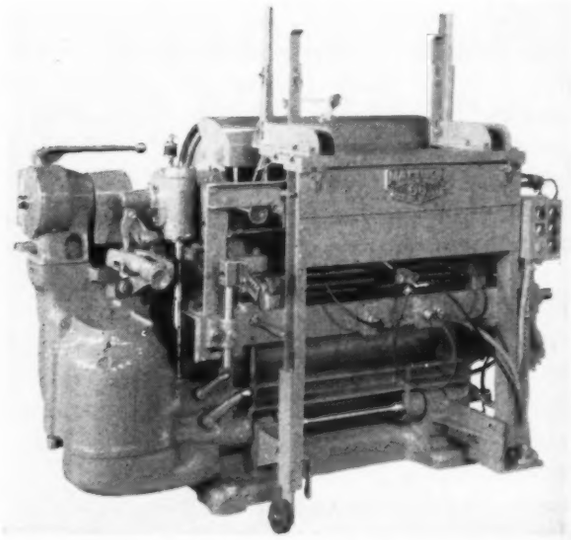
The new Stetson-Ross 6-12-C1 motorized, 14 or 16 knife, 15" x 8" ball bearing planer and matcher has top and bottom profilers built in ahead of our feed rolls. It incorporates quick change removable yoke units, 8-knife top and bottom eased edge splitterheads, and four pushbutton controlled motors for hoisting top infeed rolls, cylinder, profiler, and outfeed rolls. Pushbutton controlled outside traversing motor is not visible in this view.

Machining at the Lathe, Router and Dovetailer

Ornate Scrollwork Produced On Turning Lathe



It was in the days of rococo scroll work, gingerbread, and ornate stair cases that this 1902 model baluster turning lathe was a popular machine built by Mattison Machine Works in Beloit, Wisconsin. This was 16 years before a new plant was built in the company's present location at Rockford, Illinois.



The latest Model 66 Mattison automatic shaping lathe features an air-operated carriage and tail stock with hopper feeding attachment. The new machine handles stock from ¾" square up to 4" with a maximum length cut of 30". A reversing 2-speed 1½ h.p. feed motor provides a range of feed rates from 2 to 30 r.p.m. A 10 h.p. main drive motor runs the main arbor at 2700 r.p.m. The entire hopper feeding attachment is hinged to swing away from the front without disturbing setup adjustments.

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The "rule of thumb" methods of the inexperienced, or the "engineering rules" of an experienced design, fabrication, and installation firm—which will you select for your dust control problems?

Kirk and Blum offers you . . .

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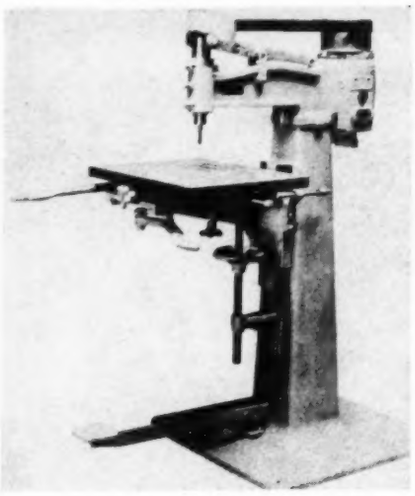
KIRK & BLUM DUST CONTROL SYSTEMS

First Sliding Spindle Router Priced at $400

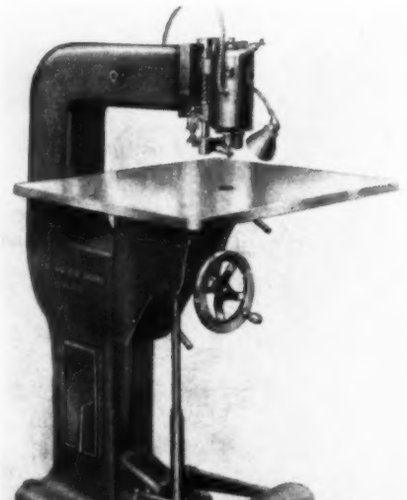
The first sliding spindle router made in 1918 by Redin-Ekstrom Company in Rockford, Illinois. Spindle speed was optionally 9,000 or 15,000 r.p.m. The table was of laminated wood construction in alternating sections of mahogany and birch as a touch of beauty. Levers were provided to give transverse and longitudinal movement of the table. On later models, a guide pin was provided for following pattern contour.



The new Ekstrom-Carlson No. 434 sliding spindle heavy duty router with 28" throat is available with 3-, 5-, or 7½-h.p. motor. A manual two-speed control selects either 10,000 or 20,000 r.p.m. spindle speeds. The tilting table and other features make this machine a modern production woodworking machine.

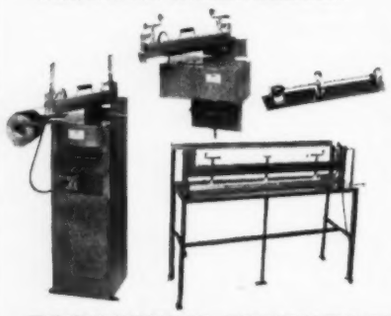
Early Router No Match For Today's Version

Early Onsrud pin router, a first step in higher speed direct drive electric motors for woodworking. While this machine was an innovation in its day, it is no match in power and capacity for today's modern routers.



The 1024 Onsrud router of 1959 is a heavy duty, large capacity machine for every type of wood and routing cut. Ample power is supplied with choices of 3 to 7½ h.p. drive motors and feed, electronically controlled start and stop, with automatic spindle braking simplify and speed up operations.

ECONAWAY
ABRASIVE BELT SPLICING EQUIPMENT



ABRASIVE BELT SPLICERS
Floor Model
Bench Model — Splices belts to 14" wide. Splice is set in seconds under pressure.
LARGE ELECTRIC PRESS ASSEMBLIES
For splicing belts from 14" to 50" wide.
MEASURING COUNTERS
Measures abrasives for belts quickly and in little space also
HIGH GRADE ABRASIVES
in rolls for all industries, "YOU SAVE EVERY WAY WITH ECONAWAY".
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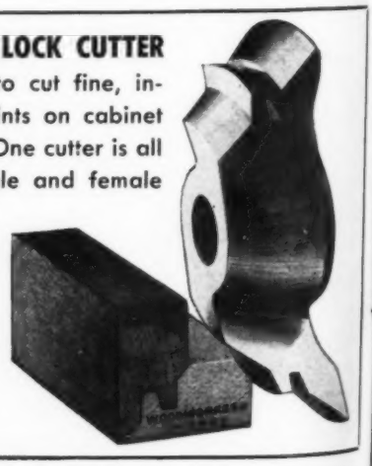
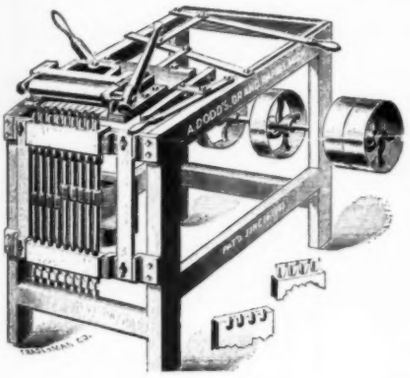
CHAMPION MITRE LOCK CUTTER
For use on shaper to cut fine, invisible mitre glue joints on cabinet work, furniture, etc. One cutter is all you need to cut male and female joints. Furnished in high speed steel or carbide tipped.



WOODWORKERS' TOOL WORKS
224 S. Jefferson St.
Chicago 6, Illinois

Dodds Dovetailer
Well-Known in Furniture Industry

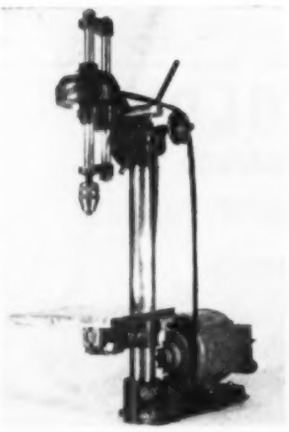


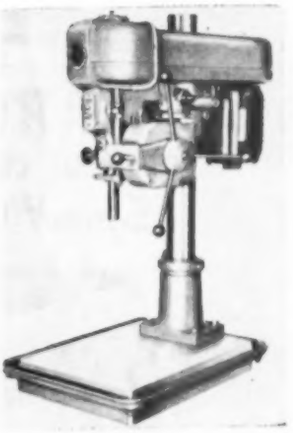
What a difference in the old belt drive dovetailer of 1886 and the present up-to-date automatic machine. Dodds dovetailing machines have kept step with progress. Today's models retain all the basic features, but have also added improvements. The manufacturer has had over 70 years experience in producing these machines. Today's model has a fully enclosed spindle unit with circulating oiling system. A spindle speed of 10,500 r.pm. and a variable speed feed to 25 strokes per minute.

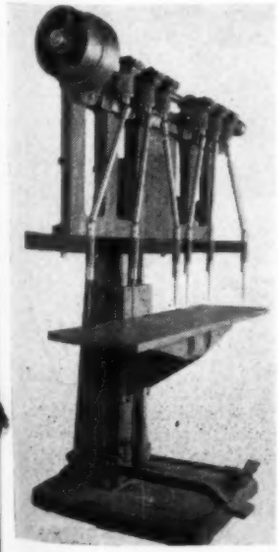
Drilling and Boring

Drill Press History

This 11" drill press, counterpart of today's powerful, rugged Walker-Turner 15" and 20" drill presses, featured "bronze-bush bearings," an 8" x 8" table, "a ball thrust bearing at top of drive spindle" and 9" chuck to table capacity. The present Walker-Turner 20" drill press is equipped with power feed. This drill press performs a variety of operations: drilling, counterboring, reaming, milling, spot facing, tapping, routing, mortising, sanding, grinding and polishing. It features a massive, one-piece head, an up-front pushbutton switch; 5 rows of ball bearings; a 24" x 18" table and a steel belt guard which enclosed the V-belt drive.



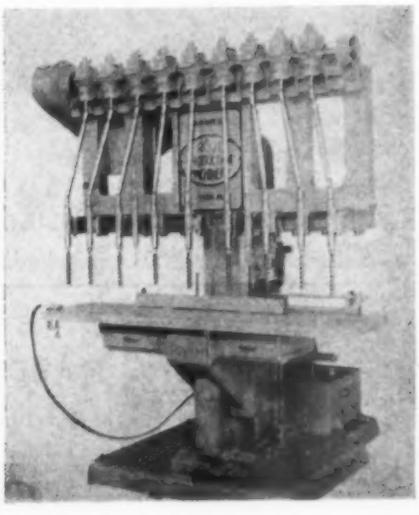




Multiple Spindle Boring Machinery

The advance in design in multiple spindle boring machinery is shown in the contrast between the Root style "C" mechanical feed borer built about 40 years ago and the present day style "CH" vertical universal hydraulic-feed boring machine.

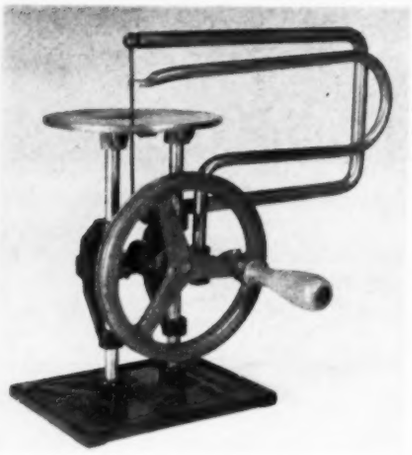
The obvious increase in weight throughout the entire structure of the machine provides a more rugged framework with the result that more accuracy is possible in drilling, even with increased feed rates. Ball and roller bearings replace bronze and babbitt bearings and provide longer life and lower maintenance costs. Individual motor drive eliminates maintenance of line shafting and



allows greater flexibility in moving machinery within the plant for better production.

The hydraulic feed on the modern boring machine permits the operator to select a rate of feed consistent with his ability to handle the stock in and out of the machine. It also provides smooth and easily controlled table motion with a minimum of maintenance. In contrast with the old mechanical feed table, which had to complete its cycle when started, the table on the modern hydraulic feed machine can be started, stopped or reversed at any point in the feed cycle providing greater safety for the operator, easier set up and elimination of possible damage to machine or work.

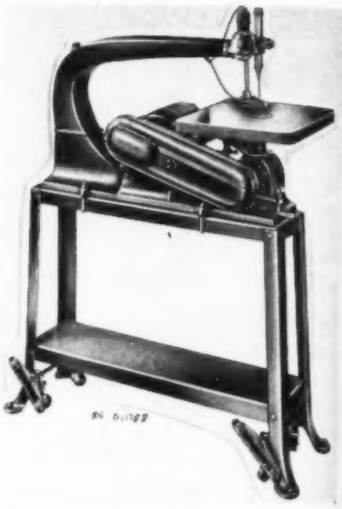
Scroll Saw Added to Delta Line



Early model of Delta scroll saw.

"The American scroll saw has no equal for the cutting of wood, bakelite, fiber, soft metals, celluloid, bone, etc." said the early catalogs about the first machine manufactured by Delta Power Tools. "The saw can be operated by hand, but for convenient and accurate work, we would suggest that you use a small electric motor. Any constant speed motor 1/20 h.p. up to 1/4 h.p. will drive this saw very satisfactorily."

Delta started making the 8" American scroll saw in 1923. Today, the Delta 24" scroll saw is available with a variable speed drive (650 to 1700 c.s.m.), a tilting table, a universal blade guide that holds all sizes of blades in true alignment and motors for either single or three phase operation.



Here is today's Delta scroll saw manufactured by Rockwell Manufacturing Co.

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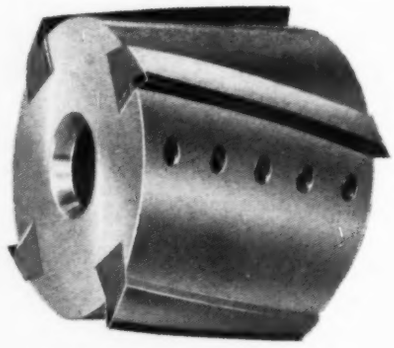

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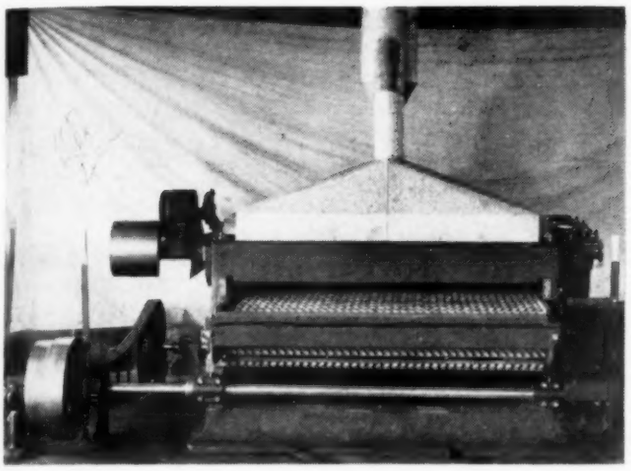
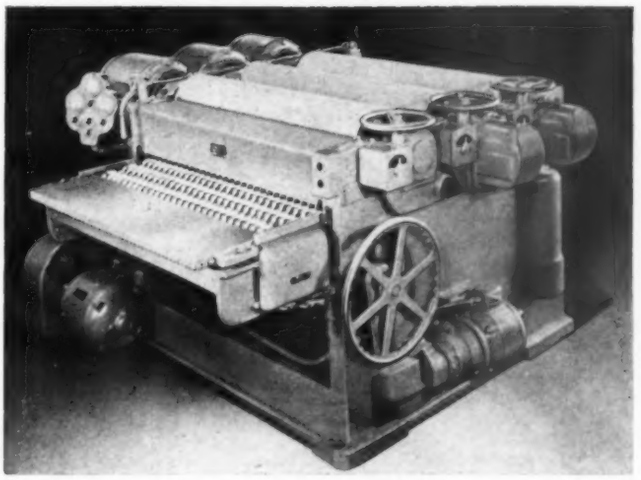
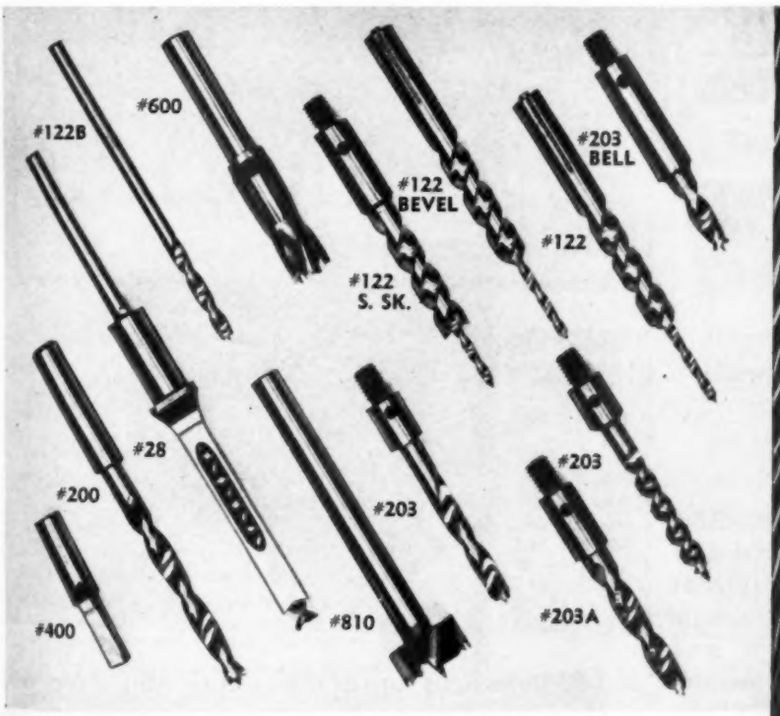
Sanding Equipment . . . Past and Present

H. B. Smith Earliest and Latest Models



Contrasted here are the first and latest models of H. B. Smith sanders. The original sander had a feed speed of 12 f.p.m.; whereas the present model has a feed speed of 12-36 f.p.m. The old model machine used an oscillating arm; the later model has a patented oscillator which is attached to the end of the drum shaft in a small compact unit. The original model was a belt driven machine. The present model is a direct drive or, in other words, the motor is an integral part of the drum shaft.





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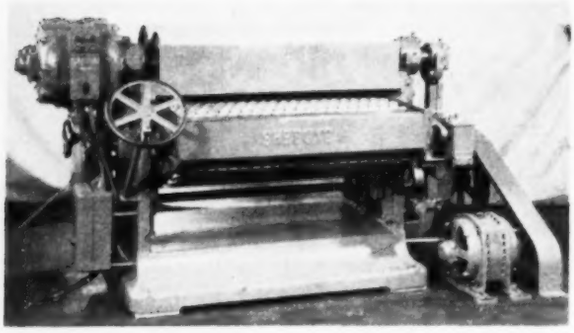
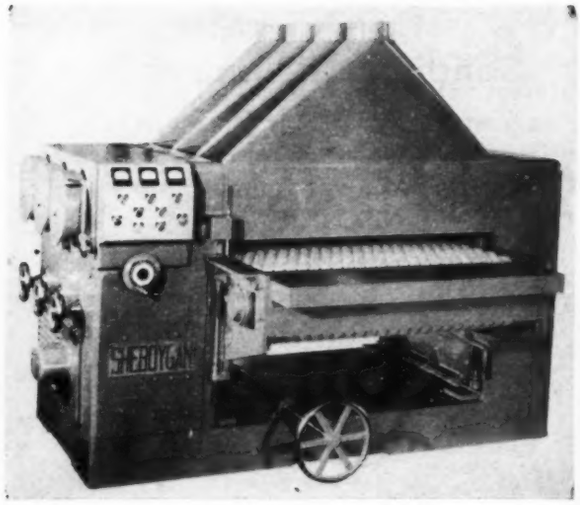
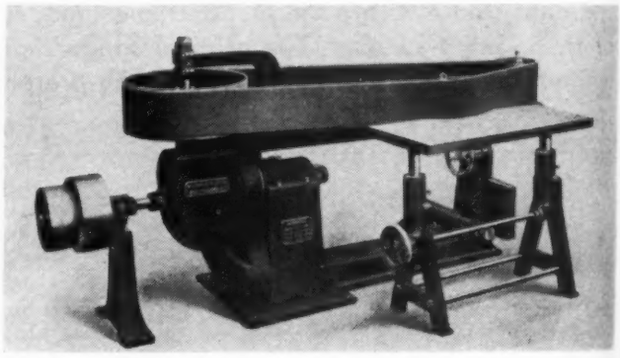
Early Sander Still Operating



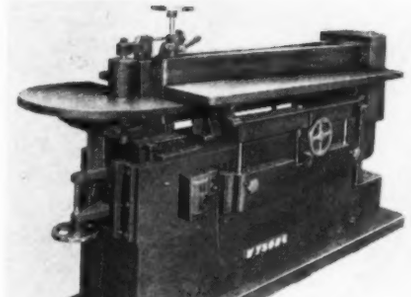


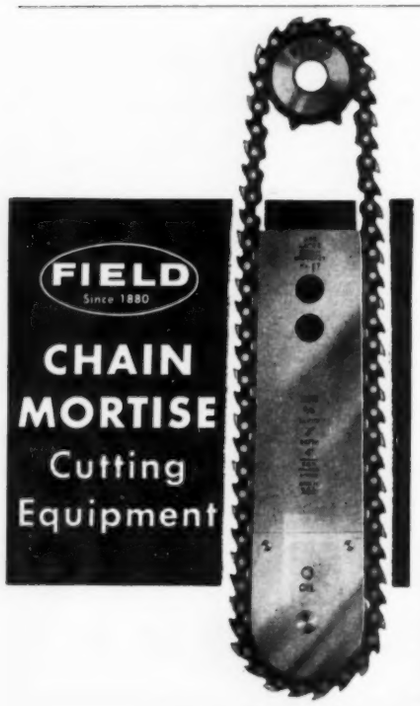
The first Sheboygan endless bed sander, manufactured under the Sheboygan name, was made 35 years ago. The machine is still operating. Today's model has individual ammeters to eliminate guess work in adjusting drums. The feed can be changed while the sander is running; handwheels for adjusting drums are graduated in thousandths of an inch and all moving parts are enclosed. The 8" dust hoods can be individually removed from the machine. Widths available are 43", 49" and 55".

Universal Sand Belt Machine Introduced in 1887



Wysong & Miles Company introduced the No. 163 before the turn of the century. Model No. 604 is recognized as its modern counterpart. The manufacturer says, "Its appearance has changed under the years, but the operations that can be performed on the No. 603 are much the same as those that were performed on the No. 163."





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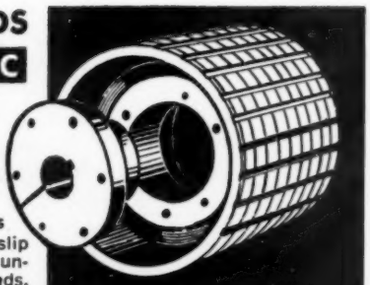

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★ RUGGED CONSTRUCTION
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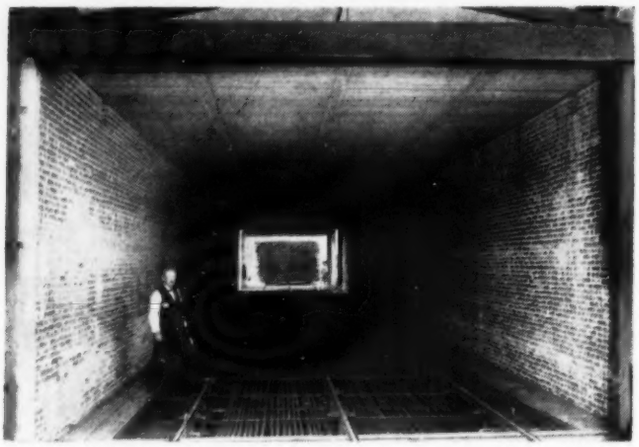
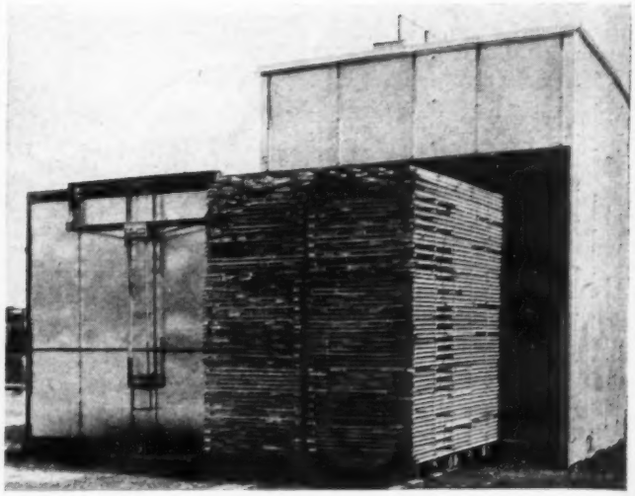
Lumber Drying and Humidity Control

Moore Moist Air Drying System



During the late 1890's, the title "Moore Moist Air Drying System" was applied to kilns made by the Moore Dry Kiln Company. It was a popular design and its success was built on the theory that an increase in vapor pressure within wood makes lumber dry when heat is applied. The new Moore prefab kiln building is a contrast to the old style kiln. This new design of building is easy to erect and has "Wege-Seal" panel joints. This type of construction eliminates all bolts, rivets or panel sheet joints exposed to inside kiln conditions and help eliminate vapor leakage.



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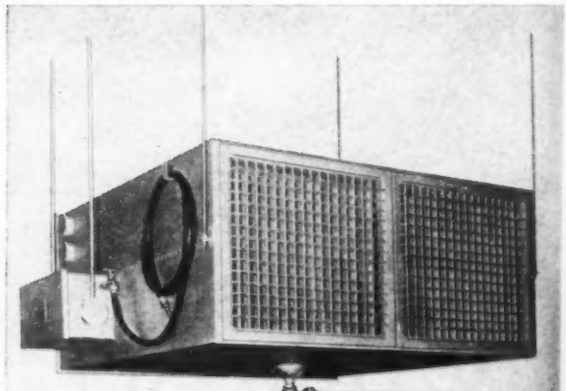
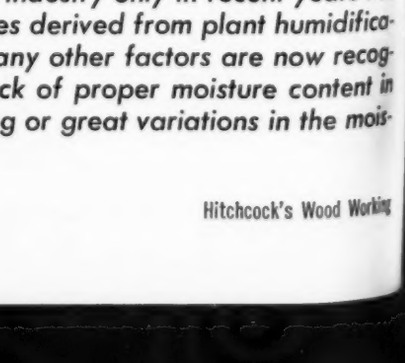
Here is the modern humidifier. Below is the old model.



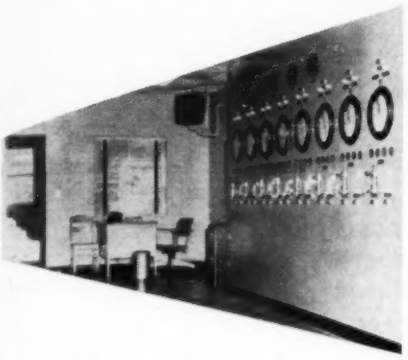
Normalair Humidifier Introduced in 1915

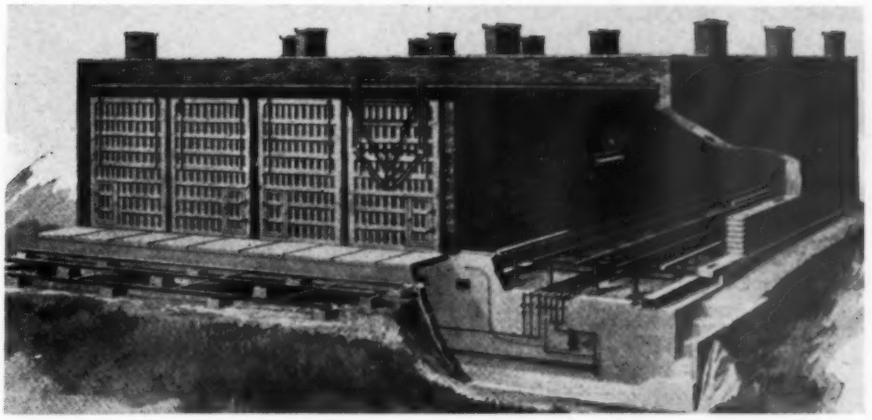


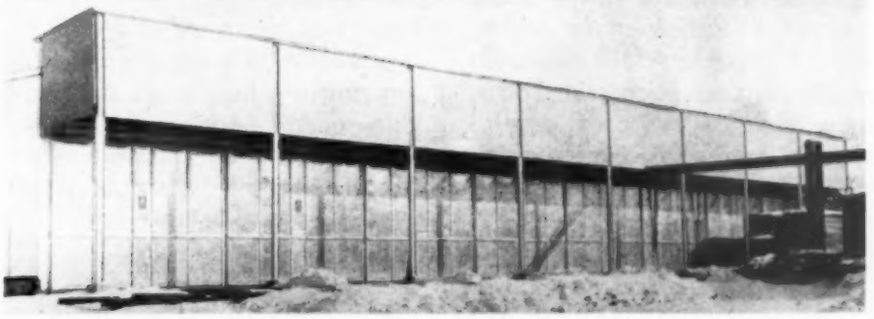
The first "Centrifual Humidifiers" were produced by the Normalair Co., Winston-Salem. These humidifiers found immediate application throughout industry. In 1918, the company was incorporated as the Bahnson Humidifier Co. and in 1929 the name was changed to the Bahnson Co. Today the Bahnson Co. manufactures a complete line of industrial humidification equipment, including over 15 different models. The woodworking industry only in recent years has come to realize the great advantages derived from plant humidification. Problems long attributed to many other factors are now recognized as having been caused by lack of proper moisture content in wood products during manufacturing or great variations in the moisture content from day to day.

Early Kilns Depended on Natural Rise of Heat

This picture shows an early dry kiln some 40 years old. The wooden doors can be seen in the picture and also the pipe beneath the trucks. In the early







days, kiln drying was dependent on the natural rise of heat through the load for the drying process. In comparison, the 40' long Standard aluminum insulated prefabricated building and equipment seen in the second picture are one of the most modern installations. This installation at the W. H. Gunlocke Chair Co., has one panel board to control the eight kilns (see insert). Circulation for these kilns is brought about by the use of Standard individually driven motor and fan units and a complete heating system under full automatic control.

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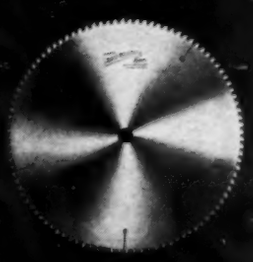

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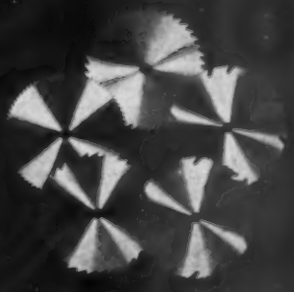

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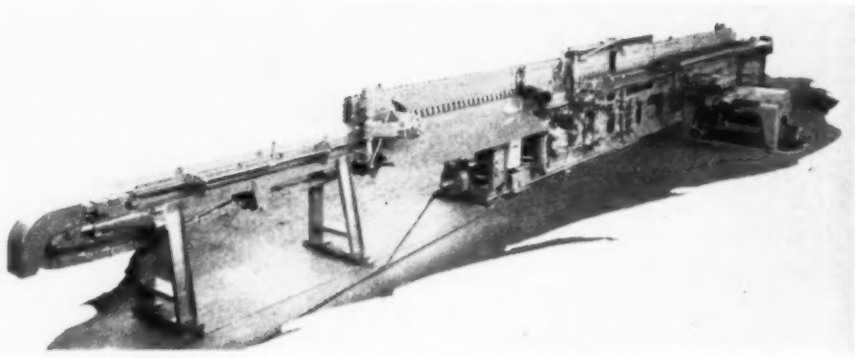
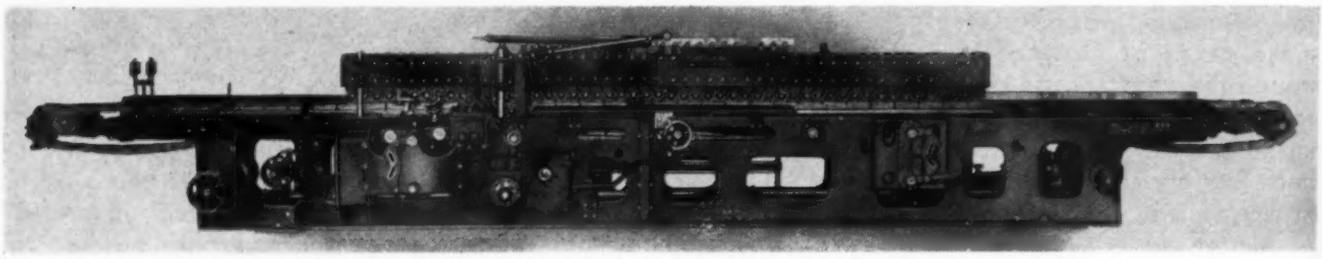


Above is the Linderman automatic wood fabricator. Older machine is illustrated below.

The idea of making wide lumber from narrow boards, using a dovetail joint along the edges, first occurred to A. T. Linderman of Muskegon, Mich., in 1885. After several years of careful study, research and experiments, the first Linderman dovetailer was designed and built to produce wide lumber for making packing boxes. As the machine became known, the importance of dovetail jointed lumber rapidly became evident in many other industries, such as those involving chair seats, furniture tops, pianos, caskets, cutting boards and many others. The dovetail joint has been refined over the years so that it now



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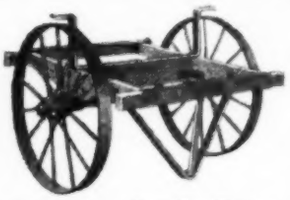

Figure 321—Lumber Buggy. Large wide tread wheels for outdoor as well as indoor use.

Figure A—Balance style for turning sharp corners. Variety of superstructures and wheel sizes.

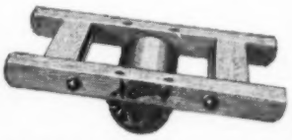

Figure 1191—Timber Dolly. Used as a dolly or, inverted as a portable roller.

Figure 2419 and 421—Jack and Skid. Stores and transports materials with one-time handling . . . One Jack services many Skids.

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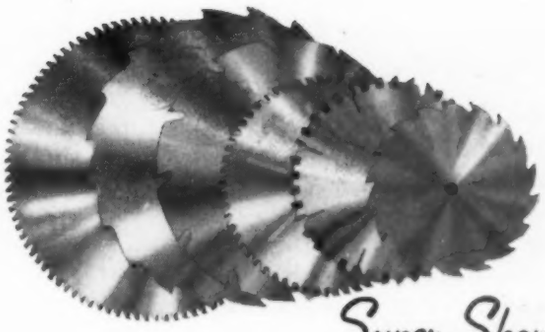

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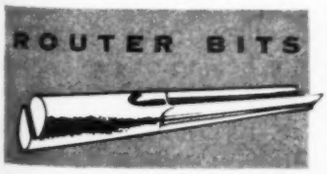

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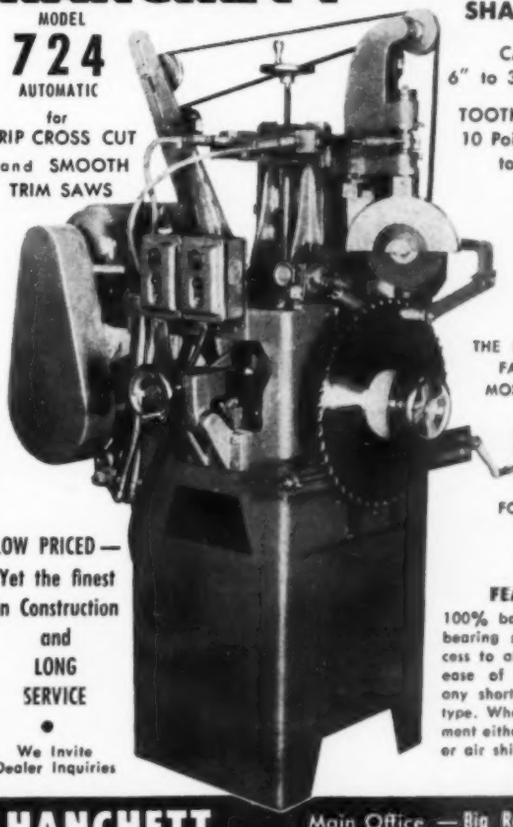
TOOTH SPACINGS 10 Points Per Inch to 2 Inch

BEVELS 18 to 50 Degrees



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FEATURES

100% ball and roller bearing shafts easy access to all moving parts ease of adjustment for any short or long tooth type. Wheel head movement either cam actuated or air shift.

HANCHETT MANUFACTURING CO.

Main Office — Big Rapids, Mich.

West Coast — Portland 1, Oregon

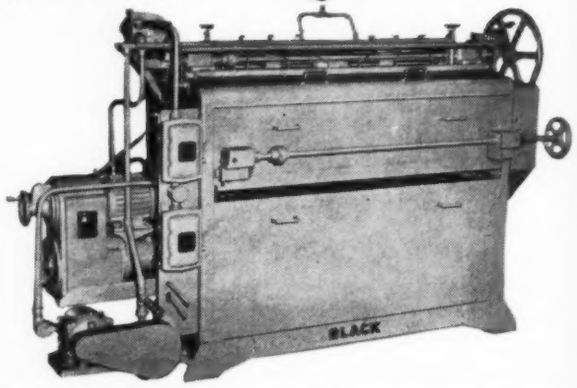
meets the exacting demands of these products.

The latest development in these machines is the "Linderman Automatic Wood Fabricator" which is engineered and built to meet any requirement. The standard type machine is designed to use straight edged lumber 4/4—8/4 in lengths from 10"—100" without an extra preparatory edging operation. The bark edger type machine is designed to use bark edged lumber with a minimum of waste. Only four men are required to operate any type Linderman machine.

New Glues Demand New Machinery

Black Brothers Company has been furnishing glue room equipment since 1882. The old machine illustrated here is an old type glue spreader which was being sold more than 30 years ago. Its use was limited to the types of glues available at the time and a precision machine was not then required.

The No. 22-D glue spreader shown is a machine in use today. It was originally designed for spreading resin glues to the component parts of aircraft plywood during World War II. However, it has been modified and various arrangements are available so that it can be furnished to successfully apply all types of glue in common usage.



Above is the Black spreader of 30 years ago. To the right is the current model of No. 22-D.

Whatever your cutting problem, take advantage of VICTORY CARBIDE's "know-how" in the design and manufacture of carbide tipped Saws, Knives and Tools. Write, wire or phone for an engineered analysis of your problems. No obligation on your part and it may save you money.

Victory CARBIDE SAW & TOOL CO.

Sharpening & repair shop at
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Memphis, Tennessee

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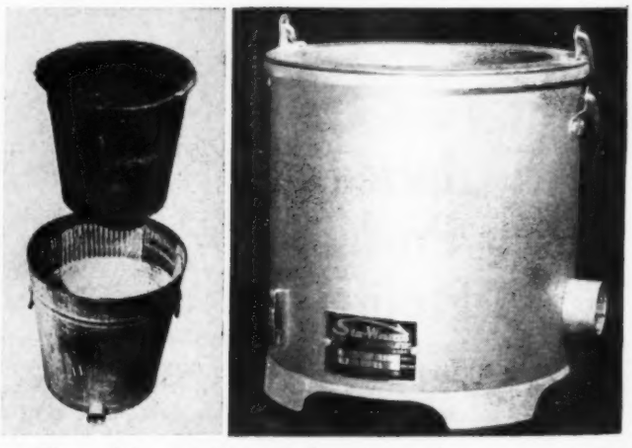
CHICAGO 13, ILLINOIS

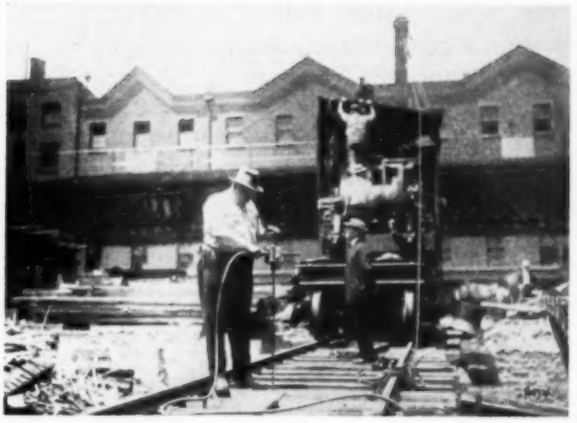
Proper Temperature Control Recognized as Gluing Need Today



The old practice of heating glue on a stove or hot plate is no longer recommended. This localized or spotty application of heat results in excess heat in some places of the pot or melter, and not sufficient in another. The concentration of heat on the bottom causes harmful boiling of the glue at this pot with the result of an inferior, brittle glue. The Sta-Warm Electric Co. furnishes electric glue heaters ranging in size from one pint to hundreds of gallons. The electric heating element consists of numerous circuits of insulated resistance wire, cemented over the bottom area and up the sidewalls, on the outside surface of the inner tank. This system of wiring covers the inner tank like a blanket and controlled by automatic thermostat.

Railroads Find Use For Drilling Machines

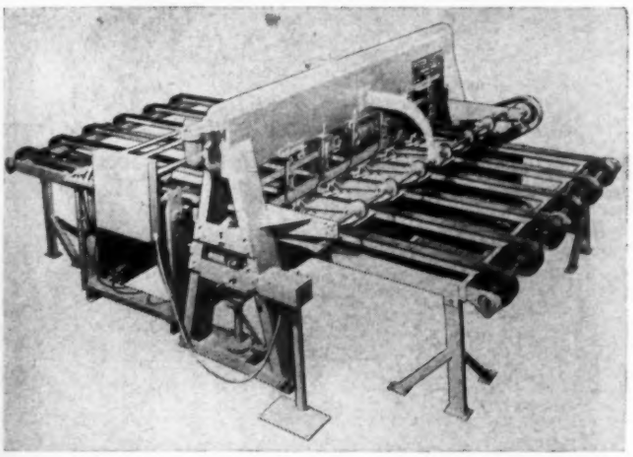
These photographs illustrate the early Ingersoll-Rand air-powered drill used in railroad track construction. To the right is the modern counterpart. This drill has a built-in lubricator that feeds a metered amount of oil to the motor. A renewable throttle valve face, made of composition rubber, eliminates air leakage. These drills are used in the manufacture of many wood products.



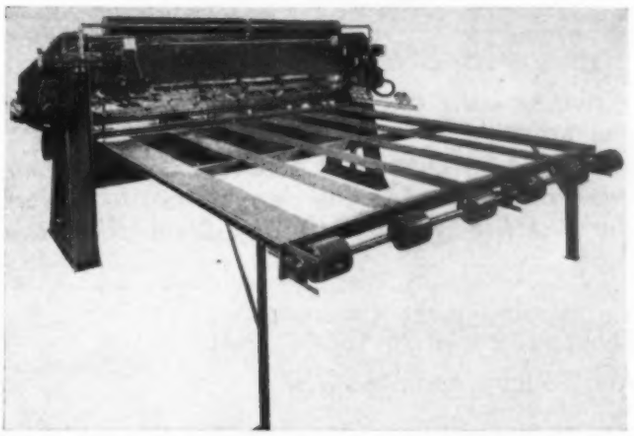
Above: This type of drill was used on railroads in tie assembly. Below: today's counterpart.

Plywood Machinery

Veneer Clipper More Recent Development



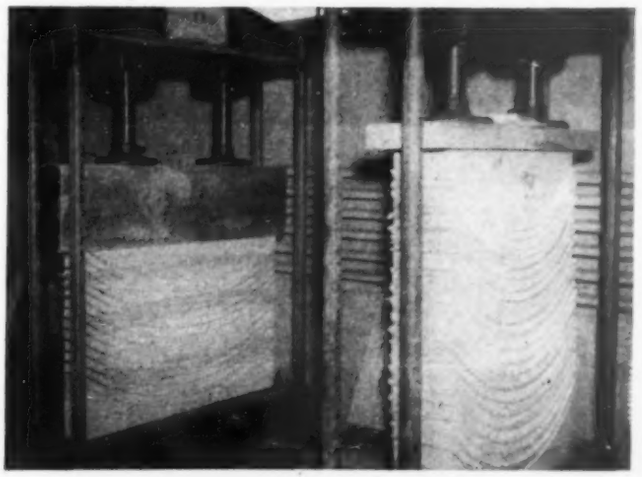
Most of the equipment described in these pages dates back 25 years or more. However, this Victor green clipper was first marketed by the E. V. Prentice Co., Portland, Ore., during World War II. The early model machine had a blade which was



actuated by two air cylinders, one at each end of the blade. The modern machine utilizes a center-mounted toggle-system with the air cylinders combined at the middle of the blade. Other features include infeed speeds up to 225 f.p.m. a chain holddown infeed system and no gears to wear or replace.

Contrast This Process

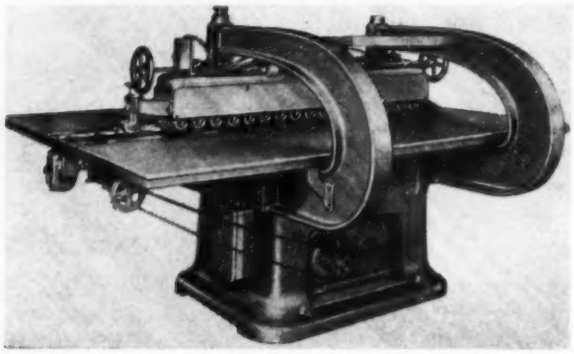
The picture of the two hand screw press illustrates how curved plywood was made 40 years ago. The hydraulic press uses radio frequency heating and can turn out more molded plywood in an hour than the screw presses could in a day.



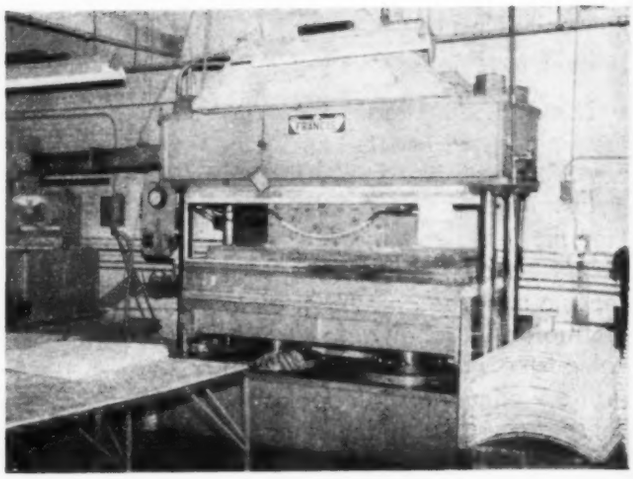
The latter method not only makes panels faster, hence more economically but it considerably improves the glue bond, dimensional stability, uniformity as well as enabling the manufacturer to make a complete matching set of drawer fronts in one multiple size panel. This information and the pictures have been furnished by Ply-Curves Inc., Grand Rapids, Mich.

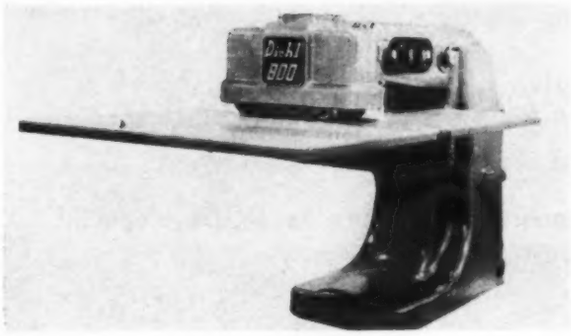
Veneer Splicer Developed By Diehl in 1938

Just 20 years ago, Diehl engineers decided that a tapeless veneer splicer would be practical. The



Wabash, Ind., company designed and experimented with a steam-heated unit but found it unreliable for continuous production. It took four years of engineering and development to perfect the first five machines. Today Diehl offers the

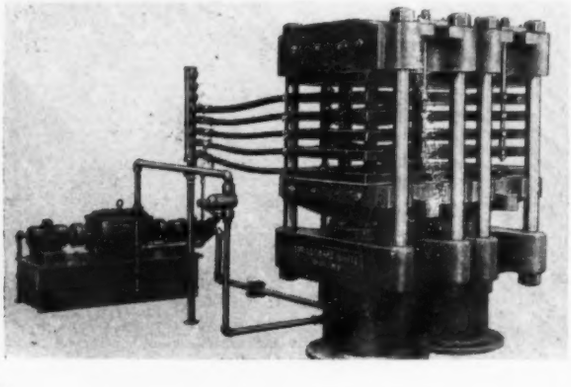


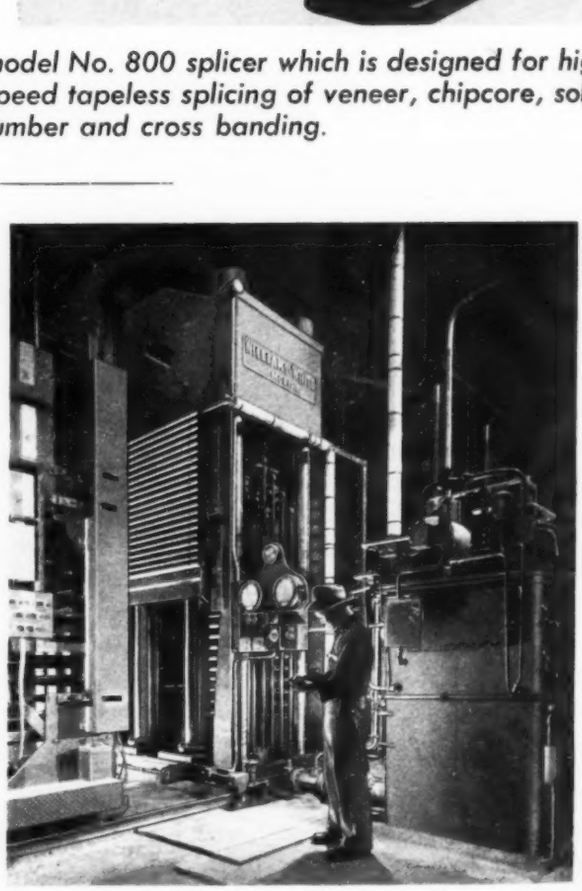


model No. 800 splicer which is designed for high speed tapeless splicing of veneer, chipcore, solid lumber and cross banding.

Plywood Presses 25 Years Ago And Today's Improved Model

The older press was made in 1933 and had five openings. This hot plate press was furnished with steam heated plates and the pumping unit included one low pressure and one high pressure pump. Control of the press was manual, i.e., moving the lever in one direction closed the press, moving it in the other direction opened it. The only equipment included on the press was a hydraulic pressure indicating gauge. No timer or temperature recording-controlling instruments were included.





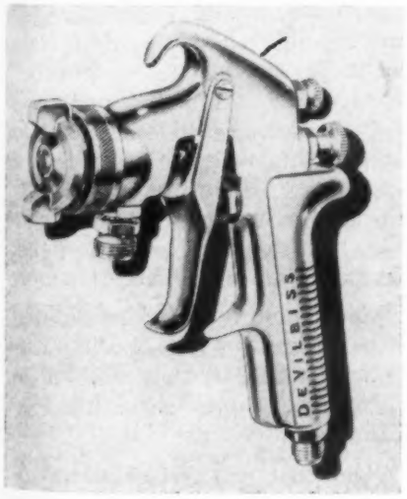
Today Williams-White & Co., Moline, Ill., furnish a 106" x 54" hot plate press with 20 opening, each of which is 3½" and with a specific pressure p.s.i. of 200 lbs. This press is in the plant of Edward Hines Lumber Co., Westfir, Ore.

Finishing and Miscellaneous Operation

Finishing Equipment

The first photograph shows one of the earlier DeVilbiss spray guns. The fluid adjusting

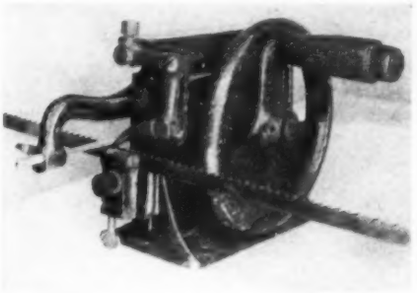
screw was at the rear of the spraying head assembly and the trigger adjusting screw ran through the handle of the gun. This type of gun was being produced by DeVilbiss in the early 1900's. The second photograph shows a modern production type



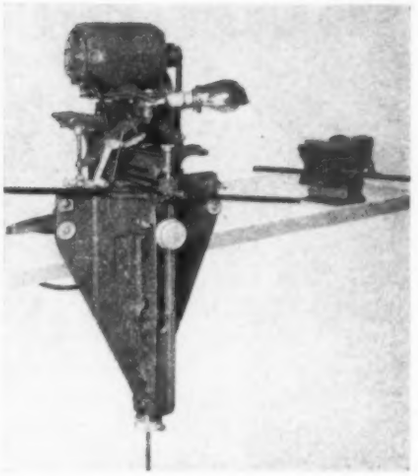
spray gun. The gun body is forged aluminum. A wide range of air caps and fluid tips adapt the gun to spraying practically all finishing materials. The gun is capable of spraying more than 12 ounces of material a minute.

Machine To File Meat Saws Is Forerunner to Foley Saw Filer

In 1900, the first Foley automatic saw filer was made. It had



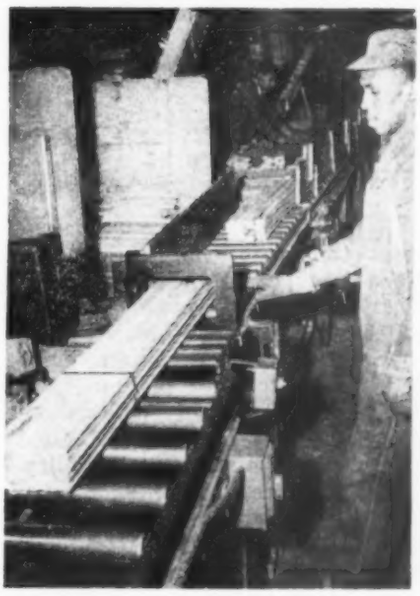
a hand crank, an automatic feed for the saw, and a 4" file. It was made to file meat saw blades. Today, 58 years later, modern Foley automatic saw filers will sharpen all hand saws, band saws up to 24', and circular cross-cut saws up to 24", with



3-16 points per inch. The present model No. 61 Foley saw filer represents more than 50 years of constant improvement in design and capacity. Foley Manufacturing Co. maintains a demonstration room at their plant in Minneapolis, Minn., where all of the Foley sharpening products may be seen.

Steel Strapping Practice

The older model of Signode steel strapping tools was made in 1912 and was used for applying tensional steel strapping to wood boxes and bundles of wood products. Basically the principle of tensioning steel strapping and then sealing a seal to the two loose ends of the strapping has not changed. However, as seen in the second photograph, to keep abreast of the many high speed production lines of today, Signode has developed equipment that applies steel strapping automatically to all types and sizes of materials, containers and boxes. All the operator does is merely press a



button on a Signode power strapping machine and another bundle of wood flooring is firmly and securely strapped. This machine is capable of applying 1000 straps per hour to bundles of flooring.

SOLUTION TO A PROBLEM

By Thomas P. Brogan

District Manager

American Forest Products Industries, Inc.

Casswood Industries, Inc., Beardstown, Ill., is another firm which has used industry's own American Tree Farm System to solve a long-range timber supply problem in its area. Their Tree Farm Family was based on plans used by many other industries to: (1) increase income for small woodland owners; (2) obtain a continual supply of timber for potential expansion of the company's production; (3) improve markets for all types of wood harvests; (4) better fire protection and a community awareness of the value of growing timber as a crop. Their Tree Farm Family plan is paving the way for a sustained yield of timber from near-by private timberlands and is solving one of the company's biggest problems: that of acquiring timber without the heavy expense of buying timberland.

The company was founded in 1951 in an area less than 20% forested to provide markets for the existing small woodland owners. The firm developed its own Tree Farm but acreage was far from sufficient to operate a grade lumber mill on a sustained yield basis as the company planned to do.

At today's peak volume of production, they figure that they need 10,000 acres under management for a sustained yield harvest to supply the sawmill and another 26,000 acres for their new pulpwood chipping operation. The company studied many ways to lick the problem.

Success of Tree Farm Families in other sections of the country was encouraging. The forestry training of Glen Massie, vice-president in charge of timber management and procurement, and his associates made it easy to launch the program whereby a wood-using industry swaps its forestry know-how to landowners in return for first refusal rights to their timber at harvest time.

Many hunting clubs are situated in the Beardstown area and Casswood decided to start with them in building a nucleus for the Tree Farm Family.

"Our first real test of salesmanship came with the largest private hunting club in the area, Grand Island," Massie recalls. "It had never been logged for fear of interfering with the duck hunting season because Grand Island is in the heart of America's greatest 'flyway'.

Kennametal Knives are available up to 50 inches. Illustrated is a 16-inch Kennametal carbide knife.

You get all these benefits when you use Kennametal* Knives

It is the basic characteristics of Kennametal that permit Kennametal Knives to provide so many benefits to the woodworker. These characteristics include extreme hardness and excellent resistance to abrasion. Combined with those properties are Kennametal's great strength and its exceptional rigidity.

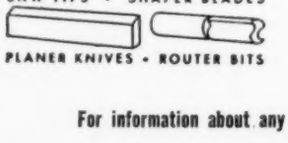
As one example, a set of Kennametal Knives, while planing 6,780,800 sq. ft. of hardboard, has averaged more than 1,250,000 sq. ft. per regrind. High speed steel knives on this operation never surfaced more than 130,000 sq. ft. between regrinds.

In addition, Kennametal Knives increased board production from 80,000 sq. ft. to 162,000 sq. ft. every two eight-hour shifts. Not only was downtime reduced substantially but the rate of feed stepped up from 37 fpm to 80 fpm, the maximum speed of the machine. Furthermore, finish was improved and board dimensions were uniform.

Have you tried Kennametal Knives in your operations? If not, or if you cannot get engineering service or carbide maintenance information from your present supplier, write to KENNAMETAL INC., Latrobe, Pa.

*Trademark

C-1014



INDUSTRY AND KENNAMETAL ...Partners in Progress

Officers of Casswood Industries: Donald Kulp, vice-president in charge of sales; Glen Massie, vice-president in charge of timber management; and Nels Glesne, president. All are graduate foresters.

"The club's management agreed to allow us to log it on a sustained yield basis with one restriction—logging operations must cease before hunting season each year."

Success with Grand Island opened the door to other hunting clubs. Now half of the 16-member family are clubs.

The club had 900 acres of merchantable size timber. That area was divided into 10 units with one unit to be cut each year for 10 years. At the end of that period, the 10-year cycle will be repeated.

After the first five years, samples from one of the units show an increase in growth in remaining trees attributed directly to removal of over-mature and defective over-story trees.

As members were added, Casswood Industries thrived. Company production of lumber hit a high of 2.5 million board feet in 1956—16 Tree Farm Family members provided 45% of the raw material for that record.

Even though a tract is managed by the company, it must be certified as a Tree Farm by the Illinois Tree Farm Committee before it becomes an official member of the Family.

"Initially," Massie says, summing up Casswood's success, "the Tree Farm Family program cost us money, but it is already showing a savings. That's because of shorter transportation hauls, less lost motion for woods equipment

SHARPEN YOUR OWN SAWS AND Save!

. . . simple to set up and use. The Oliver Ace grinds every angle of every tooth of your carbide and high speed saws—*fast!* The machine is designed to bring the wheel to the saw, providing a more accurate grind. It requires no computations and permits direct reading for clearance. Available in two models.

Also used for sharpening face mills, reamers, hobs, spot facers, straight and spiral cutters – and all general purpose tools. Write today.

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Poles and lumber on cars waiting to be put in the pressure tanks. Penta is the preservative used and Casswood Industries processes about 2½ million board feet a year.

and crews and the continuous logging of areas which are gradually improving."

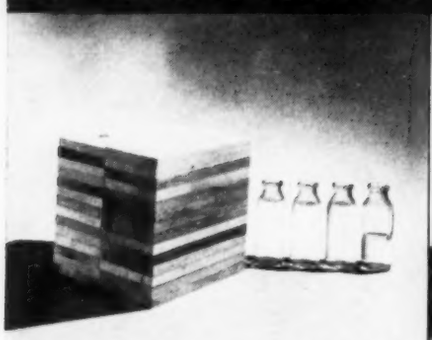
Casswood's own Tree Farm is now a show place where interested persons can see how management improves timber. A company built on plans for sustained yield production without a land acquisition program seemed impractical some years ago. Now, Casswood's partners are drawing envious glances from other Illinois wood-using firms.

The Tree Farm Family idea does not, in itself, offer insurance that forestry is a certainty. Nor does the Tree Farm program generally pose as any kind of cure-all. I do not say that the particular idea found workable by one company will work equally well for another. But I do say that in many cases where an individual company has a problem and tried the Tree Farm Family approach, company management agrees that the plan has "put wood in the yard." Further, they believe that it does a real job for the company's public relations.

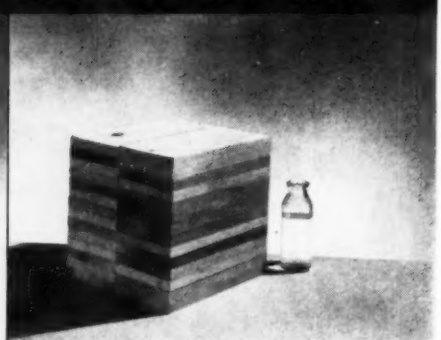
Casswood partners found out when landowners were interviewed while their story was being written that a nationwide movement in the cause of forest conservation and the sense of belongingness interested landowners beside, of course, the profit motive. The personal contact with regular visits from foresters cements the program of continuing interest in forest management.

Families are held together by a variety of arrangements, but the thing they have in common is a forester who is made available to

WHEN YOUR AIR GETS THIRSTY... IT TAKES AN EXPENSIVE DRINK



AT 60% RELATIVE HUMIDITY and 75°F., a cubic foot of wood will contain nearly 3½ pints of water, depending on the type of wood. But . . .



AT 10% RELATIVE HUMIDITY and 75°F., this same cubic foot of wood will contain only about ¾ of a pint of water. Dry air soaks up nearly 3 pints.

. . . Prevent its thirst with ARMSTRONG STEAM HUMIDIFIERS

The drastic moisture loss shown above—common in unhumidified plants during the heating season—is caused by dry air. It leads to these common problems:

1. Checking, cracking, warping
2. Glued-joint failures
3. High-temperature drying problems
4. Blushing of finishes

The way to avoid these problems is to keep wood moisture content at a controlled, desirable level with automatic, controlled humidifiers. Humidification will pay for itself over and over again—the cost of stock losses due to dry air in a single season pays for a humidifier installation in most plants.

Automatic Armstrong Steam Humidifiers give you these advantages:

Accurate Control—Within 2 to 4% of humidistat setting.

Low First Cost—Price is moderate, installation is simple (like unit heaters).

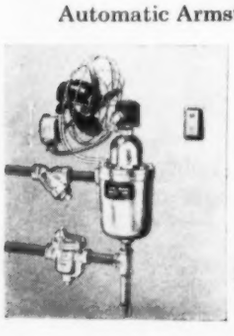
Low Operating Cost—On the average, 100,000 cu. ft. of space can be humidified for 24 hours for $1.

Low Maintenance Cost—No clogged nozzles to clean—ever. All parts designed for years of service.

No Mineral "Dust"—Clean, dry steam causes no "fallout" of residue onto equipment, finishes, and employees.

No Dripping—Only dry steam comes out.

Guaranteed to Satisfy — on a money-back basis.



SEND FOR HELPFUL BULLETIN

8-page Bulletin 505 explains the profit in humidification. Tells: Why humidity control in woodworking plants is more important today than in grandfather's time . . . how relative humidity affects woodworking . . . tables of shrinkage values and EMC variations . . . the case for steam humidification . . . advantages of Armstrong Steam Humidifiers . . . benefits obtained by present woodworking users. To get your copy, call your local Armstrong Representative, or write:

Armstrong Machine Works

8635 Maple St., Three Rivers, Michigan

804-SH

Yard man directing the lift truck operator as he stacks lumber at Casswood Industries.

family members. This service builds friendship that, in the final analysis, often determines the success of the venture.

Size of the family varies with company requirements. Probably the smallest of the active families is that of the Hardes Lumber Corp. at Bradford, Pa., with seven members owning some 5000 acres and one of the largest is A. De Weese Lumber Co., Philadelphia, Miss., with 260 members owning some 135,000 acres. There are at least 17 families in 13 states and there may be several more companies practicing most of the principles, but not yet ready to announce themselves as Tree Farm Families.

The Tree Farm Family plan has achieved the objectives Casswood Industries set up for themselves: they have an assured source of supply for timber for potential expansion of their production; they have improved wood harvesting in their area and created a community awareness of the value of growing timber as a crop.

The Tree Farm Family plan will extend to other companies and woodlot owners in the near future. It offers a wood products manufacturer—who wishes to purchase logs not lumber—an opportunity to pick and guarantee his source of supply at a minimum cost. Perhaps this plan has application in your operation.

Technical Series Booklets

No.		Price
101	**Glossary of Adhesive Terms**—Twenty pages of adhesive terms used in the woodworking industry.	25c
102	**American Woods**—More than 80 different wood species described and best utilizations listed.	35c
103	**Electronic Gluing**—A comprehensive survey of electronic gluing applications covered in this 80-page booklet.	1.00
104	**Types of Plywood**—The various types of plywood; manufacture of and utilizations.	1.00
105	**Handy Reference Table**—A 16-page booklet including helpful tables for every woodworker.	25c
106	**Gluing Techniques for Woodworkers**—Tom Perry describes current gluing techniques in this 50-page booklet.	50c
107	**Cutting Techniques for Woodworkers**—Fundamentals as to how different tools function in separating fibres of wood, 50 pages.	50c
108	**Furniture Finishing**—A series of articles covering all phases of furniture finishing—from abrasives to polishing operations.	1.00

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Get More From Wood Waste....

...MORE HEAT, more economy, if you burn it

...MORE PROFIT, lower costs, if you sell it

WILLIAMS "No-Nife" HOGS

When used for fuel, wood scrap reduced to chips in a Williams Hog produces maximum heat . . . burns evenly . . . won't restrict flow of air . . . keeps smoke at a minimum. Handling costs are reduced as much as 75%!

When processed for sale as particle board chips, or as sawdust or wood flour, a Williams Hog produces a better quality, more uniform product . . . increases output . . . requires less labor . . . keeps power and maintenance costs low.

Automatic installations for handling wood waste show exceptional savings or profits.

Ask for brochure.

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WILLIAMS
CRUSHERS GRINDERS SHREDDERS
OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD

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EM-KAY Engineering

do it!

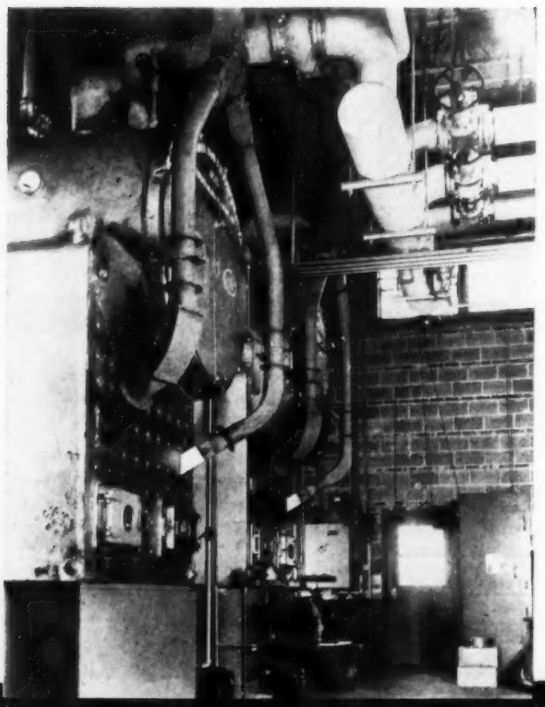
Do What??

Solve your dust collecting problems from machines to suspension burning in boiler room

How?

1. Solve your waste disposal problem.
2. Cut your insurance costs.
3. Automatically dispose of wood waste.
4. Use wood waste for fuel or by-product.
5. Eliminate smoke and ash.
6. Keep plant and equipment clean.
7. Increase plant efficiency.
8. Reduce labor costs.

Typical Installation



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Describe your problems so that a solution can be offered. There is no obligation . . . and for a clean plant, low cost insurance and trouble-free waste disposal invesigate the EM-KAY Suspension-Burning SYSTEM.

write or wire TODAY!

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P.O. Box 42 Forest Park, Ill.

How To Select An Adhesive

This table has been compiled from questionnaires received from a number of adhesive suppliers. Names and addresses are listed on page 163. Note that these suppliers often recommend more than one glue, or type of glue, for a particular operation. It is often advisable to check with your supplier to be sure that you are using the best adhesive for your specific bonding operations.

Supplier	Type of Adhesive Recommended	Trade Name	Recommended application and special features of this adhesive
ASSEMBLY JOINTS—dowel			
American Cyanamid Co.	urea form.	URAC 180	Liquid cold set. Flour extended or unextended. Highly moisture resistant adhesive.
	urea form.	URAC 110	Powdered urea (same as above).
	mod. urea form.	URAC 185	Modified urea form. resin specially formulated to give craze resistant glue lines up to 0.02" thick. Gap-filling adhesive. Cold setting, moisture resistant bond.
American-Marietta Co.	urea form.	AMRES	For interior type bonds.
	resorcinol	RESORSABOND	For exterior type bonds.
	phenol resorcinol		
Armour Adhesive Div.	resin emulsion	TIMBOND	
	hide glue		Used cold—cold curing Used hot—cold curing
The Borden Company	casein glue	CASCO 1316	Non-staining type, usable below 70° F., long life.
	polyvinyl resin	CASCOREZ CV-765, CV-755	Non-staining, fast-setting, unlimited usable life, colorless.
	urea form. resin	CASCO Resin 5H	Non-staining, high water resistant.
Catalin Corp. of America	urea form.	Catalin Resin 813	Interior application.
	modified urea form.	Catalin Resin 8666	Application requiring craze resistance.
	phenol-resorcinol form.	Catalin Resin 736	For exterior application.
Franklin Glue Co.	white resin	Evertite, Griptite, Titebond	Fast set, high strength.
	aliphatic resin		High strength, medium fast set, cold flow resistance, heat resistance, easy spreading.
	liquid hide	Franklin's	High strength, heat-resistant, long assembly time, non-corrosive, easy spreading.
Gill Chemical Prod.	white resin	Mend-All	
Midland Adhesive	PVA	No. 201 Wood Tite	Apply by brush or coater, fast setting.
Morningstar-Paisley	liquid resin	Paisley No. 2451	Quick setting, requires no heat, colorless film, moisture resistant.
National Casein Co.	polyvinyl	No. 8000, No. 5005	Cold press, quick set.
National Starch Products	40-0212	Wood-Lok	Both are ready for use, stable in long term storage, can be used for hand or machine applications. Used in all assembly operations down to 50° F.
	40-0216	"	
Perkins Glue Co.	urea resin	L-100 with TWA	Separate application resin & catalyst
	polyvinyl	VL-75	
	casein	No. 1956	
	animal	Liquid Soldide	
Peter Cooper Corp.	hot hide glue	standard grades, 1 extra special 1XM, 1¼, etc.	Recommended for all assembly gluing. Use at 145° F, fast set, high strength.
	liquid hide glue	Type B	Recommended for all assembly gluing.
	polyvinyl resin	PV-1	Recommended for all assembly gluing. Fast set
Reichhold Chemicals Inc.	polyvinyl acetate	Plyamul No. 9153	Strong joints, quick set
Synco Resins, Inc.	935-D	SYNCO	Brush, dip, spray, water-emulsion.
United States Plywood	polyvinyl acetate	Weldwood Presto-Set	Non-structural, interior usage.
	urea powder	Weldwood plastic	All structural interior use.
	resorcinol	Weldwood waterproof	All structural exterior use.
Wilhold Products Co.	vinyl	Wilhold white	Pressure flow gun. Quick setting.
ASSEMBLY JOINTS—mortise & tenon			
American Cyanamid Co.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel. See Above.
American Marietta	"	"	"
Armour Adhesive Div.	"	"	"
The Borden Co.	casein	Casco Grade A	Usable below 70° F., gap filling.
	polyvinyl resin	Cassorez CV-765 CV-755	Non-staining, fast-setting, unlimited usable life, colorless.
	urea form. resin	Casco resin 150	Gap-filling, craze-resistant, high water resistance.
Catalin Corp.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
Franklin Glue Co.	"	"	"
Gill Chemicals	"	"	"
Midland Adhesive Corp.	"	"	"
Morningstar-Paisley	"	"	"

Supplier	Type of Adhesive Recommended	Trade Name	Recommended application and special features of this adhesive
National Casein Co.	polyvinyl	No. 8000 No. 5005	Cold press, quick set.
	urea	No. 750	High frequency only.
National Starch	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
Perkins Glue Co.	polyvinyl casein animal	VL-75 No. 1956 Liquid Coldide	"
Peter Cooper Corp.	same adhesives and recomm	endation as under ASSEMBLY	JOINTS—dowel.
Reichhold Chemical Inc.	"	"	"
Synco Resins, Inc.	"	"	"
United States Plywood	"	"	"
Wilhold Products Co.	"	"	"
ASSEMBLY JOINTS—dovetail			
American Cyanamid	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
American-Marietta Co.	"	"	"
Armour Adhesives Div.	"	"	"
The Borden Co.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—mortise.
Catalin Corp.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
Franklin Glue Co.	"	"	"
Gill Chemicals	"	"	"
Midland Adhesives	"	"	"
Morningstar-Paisley	"	"	"
National Casein Co.	"	"	"
National Starch	"	"	"
Perkins Glue Co.	polyvinyl casein animal	VL-75 No. 1956 Liquid Coldide	
Peter Cooper Corp.	same adhesives and recomm	endation as under ASSEMBLY	JOINTS—dowel.
Reichhold Chemical Inc.	"	"	"
Synco Resins, Inc.	"	"	"
United States Plywood Corp.	"	"	"
Wilhold Products Co.	"	"	"
ASSEMBLY JOINTS—butt (side and edge grain)			
American Cyanamid	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
American Marietta Co.	"	"	"
Armour Adhesives Div.	"	"	"
The Borden Co.	polyvinyl resin	Cascorez CV-765, CV-755	Non-staining, fast-setting unlimited usable life, colorless.
	urea form. resin	Casco resin 150	Gap-filling, craze-resistant, high water resistance.
	casein	Casco 350	Fast-setting, usable below 70° F., specification grade, gap-filling.
Catalin Corp.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
Franklin Glue Co.	"	"	"
Gill Chemicals	"	"	"
Midland Adhesives	"	"	"
National Casein Co.	"	"	"
National Starch	"	"	"
Perkins Glue Co.	urea resin urea resin animal polyvinyl casein	L-100-HF-12 L-100-TWA Liquid Coldide VL-75 No. 1956	RF curing, Separate application resin & catalyst
Peter Cooper Corp.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
Reichhold Chemicals	"	"	"
Synco Resins, Inc.	"	"	"
United States Plywood Corp.	"	"	"
Wilhold Products Co.	vinyl or mod. urea	Wilhold white Wilhold Rea-X	spreader

Supplier	Type of Adhesive Recommended	Trade Name	Recommended application and special features of this adhesive
ASSEMBLY JOINTS—lap			
American Cyanamid Co.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
American-Marietta Co.	"	"	"
Armour Adhesives Div.	"	"	"
The Borden Co.	urea form. resin	Casco Resin 150	Gap-filling, craze-resistant, high water resistance.
	resorcinol form.	Cascophen RS-216	Waterproof, gap-filling, craze-resistant
Catalin Corp.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
Franklin Glue Co.	"	"	"
Gill Chemicals	"	"	"
Midland Adhesives Corp.	"	"	"
Morningstar-Paisley	"	"	"
National Casein Co.	"	"	"
National Starch Products	"	"	"
Perkins Glue Co.	urea resin	L-100-HF-12	RF curing.
	urea resin	L-100-HF-TWA	Separate application.
	polyvinyl	VL-75	
	casein	No. 1956	
	animal	Liquid Coldide	
Peter Cooper Corp.	same adhesives and recomm	endations as under ASSEMBLY	JOINTS—dowel
Reichhold Chemicals, Inc.	"	"	"
Synco Resins, Inc.	"	"	"
U. S. Plywood Corp.	"	"	"
Wilhold Products Co.	"	"	"
ASSEMBLY JOINTS—scarf			
American Cyanamid Co.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
American-Marietta Co.	"	"	"
Armour Adhesives Div.	"	"	"
The Borden Co.	polyvinyl resin	Cascorez CV-765, CV-755	Non-staining, fast-setting, unlimited usable life, colorless.
	urea form. resin	Casco Resin 5H	Non-staining, high water resistance.
Catalin Corp.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
Franklin Glue Co.	"	"	"
Gill Chemicals	"	"	"
Midland Adhesives	"	"	"
Morningstar-Paisley	"	"	"
National Casein Co.	polyvinyl	No. 8000, No. 5005	Cold press, quick set.
	resorcinol	R3	Hot press, cold press and RF.
	urea	No. 750	Hot press, cold press and RF.
National Starch Products	same adhesives and recomm	endations as under ASSEMBLY	JOINTS—dowel
Perkins Glue Co.	urea resin	L-100-HF-12	RF curing.
	urea resin	L-100-TWA	Separate application
	polyvinyl	VL-75	
	casein	No. 1956	
	animal	Liquid Coldide	
Peter Cooper Corp.	same adhesives and recomm	endation as under ASSEMBLY	JOINTS—dowel.
Reichhold Chemicals Inc.	"	"	"
Synco Resins, Inc.	"	"	"
U. S. Plywood Corp.	"	"	"
Wilhold Products Co.	"	"	"
ASSEMBLY JOINTS—slip			
American Cyanamid Co.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
American-Marietta Co.	"	"	"
Armour Adhesives Div.	"	"	"
The Borden Co.	polyvinyl resin	Cascorez CV-765, CV-755	Fast-setting, tackiness, colorless, long usable life.
Catalin Corp.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
Franklin Glue Co.	"	"	"
Gill Chemicals	"	"	"
Midland Adhesives	"	"	"

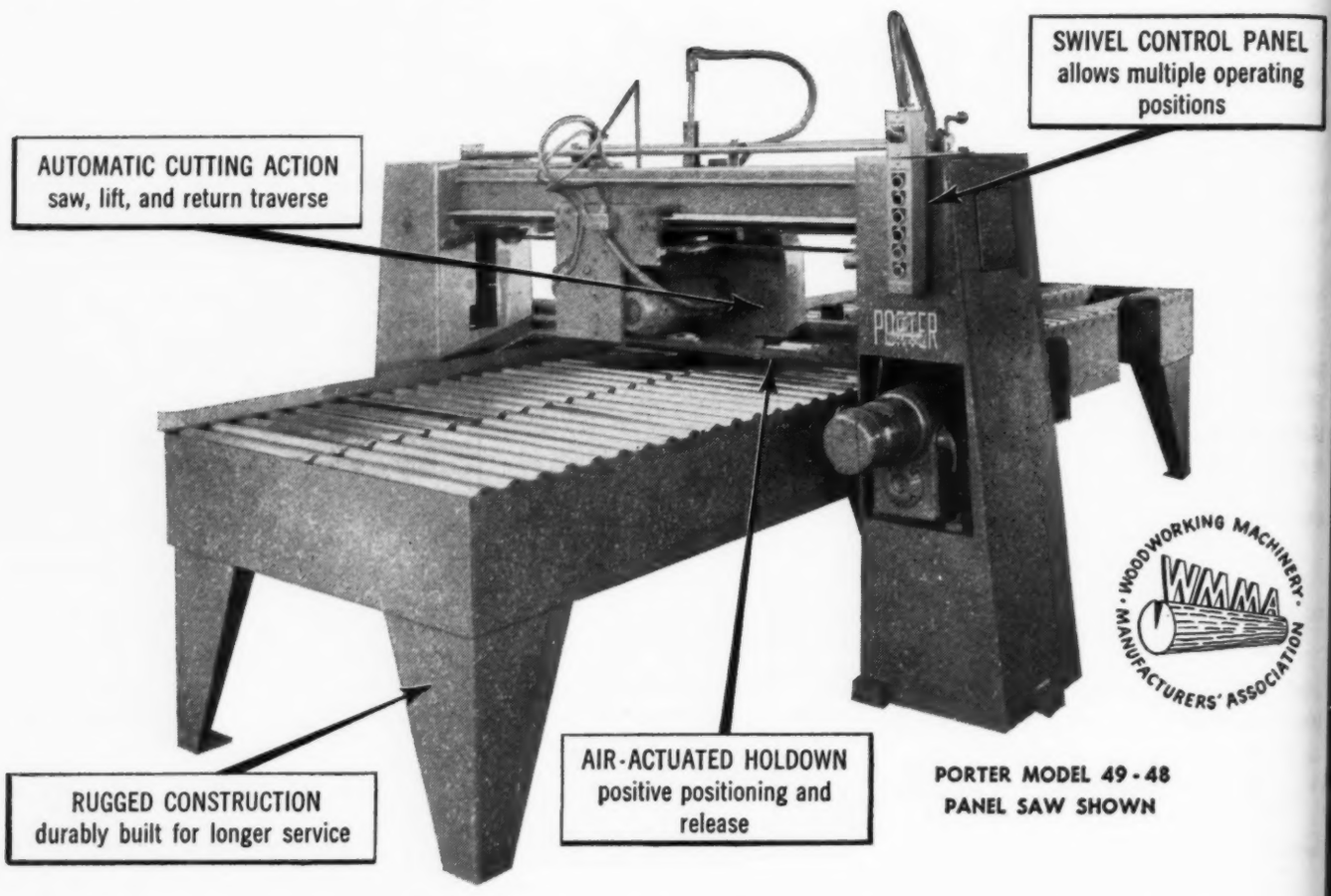
Supplier	Type of Adhesive Recommended	Trade Name	Recommended application and special features of this adhesive
Morningstar-Paisley	same adhesives and recomm	endations as under ASSEMBLY	JOINTS—dowel
National Casein Co.	"	"	"
National Starch Products	"	"	"
Perkins Glue Co.	urea resin urea resin polyvinyl casein animal	L-100-HF-12 L-100-TWA VL-75 No. 1956 Liquid Coldide	RF curing, Separate application
Peter Cooper Corp.	same adhesives and recomenda	tions as for ASSEMBLY JOINTS	—dowel.
Reichhold Chemicals, Inc.	"	"	"
Synco Resins, Inc.	"	"	"
U. S. Plywood Corp.	"	"	"
Wilhold Products Co.	"	"	"
ASSEMBLY JOINTS—finger			
American Cyanamid Co.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
American-Marietta Co.	"	"	"
Armour Adhesives Div.	"	"	"
The Borden Co.	polyvinyl resin urea form. resin	Cascorez CV 765 CV-755 Casco resin 150	Non-staining, fast-setting, unlimited usable life, colorless. Craze-resistant, gap-filling, high water resistance.
Catalin Corp.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
Franklin Glue Co.	"	"	"
Gill Chemicals	"	"	"
Midland Adhesives	"	"	"
Morningstar-Paisley	"	"	"
National Casein Co.	polyvinyl urea	No. 8000, No. 5005 No. 750	Cold press, quick set. High frequency only.
National Starch Products	40-0218 with accellerator 41-1900	Wood Lok	High speed finger joint operations use 40-0218 activated with five parts 41-1900. No RF or heat cure required.
Perkins Glue Co.	urea resin urea resin polyvinyl casein animal	L-100-HF-12 L-100-TWA VL-75 No. 1956 Liquid Coldide	RF curing, Separate application
Peter Cooper Corp.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
Reichhold Chemicals Inc.	"	"	"
Synco Resins, Inc.	"	"	"
U. S. Plywood Corp.	"	"	"
Wilhold Products Co.	"	"	"
EDGE GLUING—jointer or ripsaw joint			
American Cyanamid Co.	urea form. mod. urea form.	URAC 110 and 180 URAC 185	
American-Marietta Co.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
Armour Adhesive Div.	hide glue		Used hot—cold curing.
The Borden Co.	casein polyvinyl resin	Casco Grade A, 350 Cascorez CV-765, CV-755	Gap-filling, usable below 70° F., fast-setting, foolproof. Non-staining, fast-setting, unlimited usable life, colorless.
	urea form. resin	Casco Resin 5H	Non-staining, high water resistance.
Catalin Corp.	urea formaldehyde	Catalin Resin 813	
Franklin Glue Co.	aliphetic resin	Titebond	High strength, fast setting, cold flow resistance, lacquer resistant.
	liquid hide glue white resin	Franklin Liquid Hide Evertite, Griptite	High strength, heat resistant, long assembly time. High strength, fast set.
Gill Chemicals	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
Morningstar-Paisley	"	"	"
National Casein Co.	polyvinyl urea resorcinol casein	No. 5005 No. 750 R3 No. 130, No. 3530	Cold press, quick set. Hot press, cold press or RF. Hot press, cold press or RF. Cold press.
National Starch Products	40-0212 40-0216	Wood Lok	Ripsaw joint not recommended.

Supplier	Type of Adhesive Recommended	Trade Name	Recommended application and special features of this adhesive
Perkins Glue Co.	urea resin	L-100-HF-12	RF curing,
	urea resin	L-100-TWA	Separate application
	polyvinyl	VL-75	
	casein	No. 1956	
	animal	Liquid Coldide	
Peter Cooper Corp.	hot hide glue	Standard grades, 1 ex. special, 1XM, 1¼, etc.	Customary for clamp carrier edge gluing. Use at 145° F. High strength, fast set.
	liquid hide	Type B	For clamp carrier.
	mod. polyvinyl	Type PV-2	Clamp carrier, edge gluing, fast set, high strength, resistance to heat.
	resin emulsion		
Reichhold Chemicals, Inc.	urea form.	Plyamine No. 6910	
Synco Resins, Inc.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
U. S. Plywood Corp.	urea powder	Weldwood Plastic	Interior structural.
	resorcinol	Weldwood Waterproof	Exterior structural.
Wilhold Products Co.	powdered urea	Wilhold Plastic	Spreader, hard glue line.
EDGE GLUING—tongue & groove			
American Cyanamid	urea form.	URAC 110 and 180	
	mod. urea form.	URAC 185	
American-Marietta Co.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
Armour Adhesives Div.	hide glue		Used hot—cold curing.
The Borden Co.	casein	Casco Grade A	Usable below 70° F., gap-filling.
	urea form. resin	Casco Resin 5H	Non-staining, high water resistance
	polyvinyl resin	Cascorez CV-765, CV-755	Non-staining, fast-setting, unlimited usable life, colorless.
Catalin Corp.	urea form.	Catalin Resin 813	Interior application.
	mod. urea form.	Catalin Resin 8666	Application requiring craze-resistance.
	phenol-resorcinol form.	Catalin Resin 736	For exterior application.
Franklin Glue Co.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
Gill Chemicals	"	"	"
Morningstar-Paisley	"	"	"
National Casein Co.	polyvinyl	No. 5005	Cold press, quick set.
	urea	No. 750	Hot press, cold press or RF.
	resorcinol	R3	Hot press, cold press or RF.
	casein	No. 30, No. 3530	Cold press.
National Starch Products	40-0212	Wood Lok	40-0293 for lower cost glue line.
	20-0293		
Perkins Glue Co.	urea resin	L-100-TWA	Separate application
	polyvinyl	VL-75	
	casein	No. 1956	
	animal	Liquid Coldide	
Peter Cooper Corp.	same adhesives and recommen	dations as under EDGE GLU	ING—jointer joints.
Reichhold Chemicals, Inc.	"	"	"
Synco Resins, Inc.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
U. S. Plywood Corp.	urea powder	Weldwood Plastic	Interior structural.
	resorcinol	Weldwood Waterproof	Exterior structural.
Wilhold Products Co.	liquid urea	Acorn 516-A	Spreader, hard glue line.
EDGE GLUING—veneer			
American Cyanamid Co.	urea form.	URAC 110 and 180	
	mod. urea form.	URAC 185	
	mod. melamine	MELURAC 255	Melamine urea powdered adhesives are especially formulated as splicing glues.
	mod. melamine	MELURAC 260	
American-Marietta Co.	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
The Borden Co.	urea form. resin	Cascamite TS-26	Fast-setting, long usable life.
Morningstar-Paisley	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
National Casein Co.	urea	Splyset No. 200	Tapeless splicer glue.
National Starch Products	40-0216	Wood Lok	Very light glue spread, high temperature on pressure shoe or roll, good side pressure needed.
Perkins Glue Co.	urea resin	One Piece Splicer	Tapeless splicing
	melamine urea resin	One Piece Speedex	
	polyvinyl	VL-25	
Peter Cooper Corp.	hot hide glue	Standard grades, 1 Ex. special, 1XM, 1¼, etc.	
	polyvinyl resin	Type PV-1	New type tapeless splicing (Diehl 800).
Pierce & Stevens Chemical Corp.	contact	HYBOND	Brush, roller or trowel. Non-staining, shock-resistant bond; requires no clamps, presses or heat for curing.
Reichhold Chemicals, Inc.	same adhesives and recommen	dations as under EDGE GLU	ING—jointer joints.

Supplier	Type of Adhesive Recommended	Trade Name	Recommended application and special features of this adhesive
Synco Resins, Inc.	same adhesives and recommen	dations as under EDGE GLUING	Jointer Joints
Wilhhold Products Co.	liquid urea	Acorn 516-A	Spreader, hard glue line.
HIGH FREQUENCY BONDING			
American Cyanamid Co.	urea form.	URAC 110 and 180	Liquid cold set; flour extended or unextended; highly moisture resistant.
	melamine mod.	MELURAC 300 or 302	Powdered melamine urea adhesives provide optimum moisture resistant bond.
	mod. urea form.	URAC 185	Powdered urea; same as URAC 110.
	unmodified melamine	CYMEL 401	Boilproof bond with all types of wood.
American-Marietta Co.	urea form	AMRES	
	resorcinol form.	RESORSABOND	
	phenol resorcinol melamine form.	AMRES	
The Borden Co.	urea form. resin	Cascomite 12	One-shot type, fast-setting.
		Casco Resin 5H	Fast-setting, high water resistance.
Catalin Corp.	urea form.	Catalin Resin 813	Interior applications.
	mod. urea form.	Catalin Resin 8666	Applications requiring craze resistance.
	phenol-resorcinol form.	Catalin Resin 731	For exterior applications.
Franklin Glue Co.	aliphetic resin	Titebond	For stray field heating; fast cycle, high strength.
Midland Adhesives	urea	Midland 1253 A & B	
Morningstar-Paisley	thermosetting resin	Paisley No. 4528	Water miscible powder which has a built-in catalyst.
National Casein Co.	urea	FA-300	Gap-filling
		No. 750	Regular.
		"DR"	Powder. All three are for hot press, cold press or RF.
	resorcinol	R3	Hot press, cold press or RF.
Perkins Glue Co.	urea resin	L-100-HF-13	Strayfield panel to frame gluing.
	urea resin	L-100	With catalysts are available for special products and
	resorcinol-phenol	RP-20	applications
	melamine fortified urea resins	L-100 & Catalyst M	With S-10 catalyst.
Reichhold Chemicals, Inc.	urea-form.	Plyamine No. 6910	Fast-setting.
U.S. Plywood Co.	urea powder	Weldwood Plastic Resin Glue	Interior structural use.
	resorcinol	Weldwood Waterproof Resorcinol glue	Exterior structural use.
Wilhold Products Co.	liquid urea	Wilhold Rea-X	Gap-filling, anti-crazing; apply with spreader.
LAMINATING—plywood, flat			
American Cyanamid Co.	urea form.	URAC 110 and 180	Interior type plywood, highly moisture resistant
	mod. urea form.	URAC 185	"
	mod. melamine form.	MELURAC 300 and 302	Exterior type plywood, Type I bond.
	melamine form.	CYMEL 401	Marine grade plywood.
American-Marietta Co.	urea form.	AMRES	
	phenol form.	"	
	resorcinol form.	RESORSABOND	
	phenol resorcinol	"	
The Borden Co.	casein	Casco 4042	Non-staining type, usable below 70°F.
	urea form. resin	Casco Resin 5H	Non-staining, high water resistance.
	phenol form. resin	Cascophen	Gap-filling, craze-resistant.
Catalin Corp.	urea form.	Catalin Resin 813	
Gill Products	same adhesives and recommen	dations as under ASSEMBLY JO	INTS—dowel
Midland Adhesives	PVA	No. 201	
National Casein Co.	urea	No. 750	Hot press, cold press and RF.
	resorcinol	R3	Hot press, cold press and RF.
National Starch Products	40-0493	Kwik-Klamp	Designed for roller spreader; long (20-30 min.) lay-up time with short (20-30 min.) press cycle at relatively low pressure (40-60 P.S.I.) Use 40-0493 where color of glue line is factor.
Perkins Glue Co.	urea resin-cold press	L-100-C-2	Wheat flour extended
	urea resin-hot press	L-100, H-20 or H-252	Wheat flour extended
	urea resin-RF	L-100 with HF-48	RF curing
Reichhold Chemicals, Inc.	urea form.	Plyamines	
	phenolic	Plyophens	
	resorcinol	Plyophens	
Synco Resins, Inc.	128-CLW or 100W	Synco	Brush, roller or spray.
Wilhold Products Co.	liquid urea	Acorn No. 516-A	Hard setting.
LAMINATING—plywood, curved			
American Cyanamid Co.	urea formaldehyde	URAC 110, 180	
	mod. urea formaldehyde	URAC 185	
	melamine form.	CYMEL 401	
	mod. melamine form.	MELURAC 300-302	

Supplier	Type of Adhesive Recommended	Trade Name	Recommended application and special features of this adhesive
American-Marietta Co.	urea form. phenol form. resorcinol form. phenol resorcinol	AMRES AMRES RESORSABOND RESORSABOND	
The Borden Co.	polyvinyl resin	Cascorez CV-765, CV-755	Non-staining, fast-setting, unlimited usable life, colorless.
	urea form. resin	Casco Resin 150	Gap-filling, craze-resistant.
	resorcinol form. resin	Cascophen RS-216	Complete durability, gap-filling, craze-resistant.
Catalin Corp.	urea form.	Catalin Resin 813	
National Casein	urea	FA-300, No. 750	gapfilling) all types for regular) hotpress, cold press, or high frequency.
	resorcinol	R3	
National Starch	40-0493	Kwik-Klamp	See Laminating—Plywood, flat.
Perkins Glue Co.	urea resin-cold press	L-100 with C-2	Wheat flour extended
	urea resin-hot press	L-100, H-20 or H-252	Wheat flour extended
	urea resin-RF	L-100-HF-48	
Reichhold Chemicals, Inc.	urea form.	Plyamines	
	phenolic	Plyophens	
	resorcinols	Plyophens	
Synco Resins, Inc.	128-CLW or 100-W	Synco	Brush, roller, or spraying.
Wilhold Products Co.	liquid urea	Acorn No. 516-A	Hard setting.
LAMINATING—veneer to core—lumber or particle board			
American Cyanamid Co.	urea formaldehyde	URAC 110, 180	gap-filling properties help eliminate telegraphing.
	" "	URAC 185	
American-Marietta Co.	urea formaldehyde	AMRES	
	phenol formaldehyde	AMRES	
	resorcinol form.	RESORSABOND	
	phenol resorcinol	RESORSABOND	
The Borden Co.	polyvinyl resin	Cascorez CV-765 CV-755	Non-staining, fast-setting, unlimited usable life, colorless.
	urea form. resin	Casco Resin 5H	Non-staining high water resistance.
Catalin Corp.	urea form.	Catalin Resin 841	
Midland Adhesives	PVA	No. 201	
National Casein Co.	urea	No. 750	Gap-filling.
		FA300	Regular. Both types for hot press, cold press, RF.
	resorcinol	R3	Hot press, cold press or RF.
	casein	No. 30, No. 3530	Cold press.
National Starch Products	40-0493 40-0498	Kwik Klamp	Ready for use; designed for machine (spreader) application; long (20-30 min.) lay-up time with short (20-30) press cycle at relatively low pressure (40-60 p.s.i.) Use 40-0493 where color of glue line is factor.
Perkins Glue Co.	urea resin-cold press	L-100 & S-120	
	urea resin-cold press	L-100 & C-2	Wheat flour extended
	urea resin-hot press	L-100, H-20-H-252	Wheat flour extended
Pierce & Stevens	contact	HYBOND	Brush, roller; good heat resistance; fast drying; non-staining; no clamps, presses or heat curing.
Reichhold Chemicals Inc.	urea form.	Plyamines	
	phenolics	Plyophens	
	resorcinols	Plyophens	
Synco Resins, Inc.	128-CLW, 100-W or 935-0	Synco	Brush, roller or spray.
U.S. Plywood	urea powder resorcinol	Weldwood Plastic Resin Glue	Interior end use.
		Weldwood Waterproof Resorcinol Glue	Exterior end use.
Wilhold Products Co.	liquid urea	Acorn No. 516-A	Hard setting.
LAMINATING—timbers			
American Cyanamid Co.	urea form. mod. urea form.	URAC 110 and 180 URAC 185	
American-Marietta Co.	casein	A-M	
	resorcinol form.	RESORSABOND	
	phenol resorcinol	RESORSABOND	
The Borden Company	casein	Casco 231-P, A-JT-P	Gap-filling; specification types; not for below 70°F.
	urea form. resin	Casco Resin 150	Gap-filling, craze resistant; high water resistance.
	resorcinol form. resin	Cascophen RS-216	Gap-filling; craze resistant.
Catalin Corp.	phenol resorcinol formaldehyde	Catalin Resin 736 Catalin Resin 731	
Gill Products	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.

The NEW PORTER PANEL SAW



PORTER MODEL 49-48
PANEL SAW SHOWN

Handles ANY panel width easily, economically, automatically

Compare the specifications on the Model 49 series for yourself. We're sure that you won't find these features anywhere else in a machine at this price . . . automatic operation, controlled from either side—positive grip air actuated stock stops — carriage feeds variable from zero to desired speeds — 1⅛" diameter saw arbor — handles 18" diameter saw blade (standard) — 7½ HP, 3600 RPM saw arbor motor — 2 stroke settings standard — heavy duty construction throughout.

Here is an **all new** panel saw which offers you automatic handling ease, rugged dependability, and a price unmatched in the industry. It has been designed to cut panels to any length, required thickness, or speed. The Model 49 series features a saw arbor assembly that moves easily through the cut, then lifts clear on the return stroke to eliminate any possibility of stock damage. The carriage rides on ball bearing bushings over hardened and ground steel rods to insure rigid, straight line cutting . . . The Model 49 Panel Saw series, latest in the long line of C. O. Porter **Dividend Designed** machines.

Remember, C. O. is your guarantee of greatest COoperation

C. O. PORTER MACHINERY COMPANY
522 Plymouth Road, N. E., Grand Rapids 5, Michigan
EXPORT DIVISION: John C. Jenson International, South Haven, Michigan, U. S. A.

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Handy Information Cards

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PRODUCT INFORMATION

A quick, FREE way to obtain information about the equipment and supplies you need to buy.

___Machines, flooring
___Machines, gluing
___Machines, grooving
___Machines, handle
___Machines, knot boring
___Machines, lock corner
___Machines, mitering
___Machines, mortising
___Machines, nailing
___Machines, package making
___Machines, panel and veneer sizing
___Machines, panel assembly
___Machines, pattern-making
___Machines, plow & bore
___Machines, profiling
___Machines, rubbing
___Machines, saddle seat
___Machines, saw setting
___Machines, scarfing
___Machines, scraping
___Machines, stapling
___Machines, steel strapping
___Machines, veneer cutting
___Machines, veneer taping
___Matcher Heads
___Matchers
___Meters, lumber
___Meters, moisture
___Mixers, glue
___Mixers, paint
___Molders
___Molder Blanks
___Molder Heads
___Moldings, wood
___Mortise Chains
___Mortisers
___Meters

___Nails
___Nuts, anchor
___Paint
___Pallets
___Patchers, panel
___Patchers, veneer
___Planers
___Plastic Sheets
___Plywood
___Plywood, flexible
___Plywood, imported
___Plywood, metal faced
___Plywood, molded
___Plywood, plastic faced
___Plywood Novelties
___Polishers
___Portable electric Tools
___Pots, glue
___Presses, bending
___Presses, shipboard
___Presses, edge banding
___Presses, hardboard
___Presses, laboratory
___Presses, lumber
___Presses, panel to frame
___Presses, plywood
___Presses, veneer
___Putty
___Resaws, band
___Resins
___Rivets, blind
___Routers
___Rubbing Compounds
___Safety Clothing
___Safety Equipment
___Sander Heads
___Sanders (Specify Kind)
___Sandpaper
___Saw Benches & Tables
___Saw Blades (Specify Kind)
Sawing Machinery:
___arbor
___band
___combination
___crosscut
___cutoff
___dado
___edger
___electric portable
___gang
___jig & scroll
___planer
___radial
___rip
___swing
___tilting arbor
___variety
___Sawmills
___Screwdrivers, electric
___Screws
___Shaper Collars
___Shaper Heads
___Shaper Steel
___Shapers
___Sharpeners, chain
___Sharpeners, knife
___Sharpeners, saw
___Spreaders, glue
___Stackers, lumber
___Stains
___Staples
___Steel Strapping
___Stickers
___Strapping Tools
___Surfacers
___Table Equipment
___Taekers
___Tape, gummed
___Tensaers
___Trucks, dry kiln
___Trucks, factory
___Veneer
___Wood Preservatives

Data will come direct to you from responsible manufacturers.

Name ..... Position .....

Company .....

Products manufactured .....

Street .....

City ..... Zone ..... State .....

PRODUCT INFORMATION

A quick, FREE way to obtain information about the equipment and supplies you need to buy.

___Abrasives
___Abrasive Renewing Compound
___Adhesives (Specify Kind)
___Air Conditioning Systems
___Arbors, Motor
___Arbors, Saw
___Bags, Paper
___Band Saw Accessories
___Band Saw Tires & Wheels
___Barkers
___Bits (Specify Kind)
___Blankets, paper
___Bleachers
___Blower & Fan Systems
___Bolt Drivers
___Bolts
___Booths, spray
___Borers (Specify Kind)
___Boring Tools
___Brazing Equipment
___Brushes
___Casters
___Clamp Carriers
___Clamping Fixtures
___Clamps (Specify Type)
___Clamps & Jigs
___Cleaners, booth
___Clippers, veneer
___Compressors, air
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___Cutoff tools
___Cutter Blanks
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___Cylinders, air
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___Dado Heads
___Dimension Stock
___Dowels
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___Driers, furniture
___Driers, veneer
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___Drill Heads
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___Drills, multiple spindle
___Dry Kilns
___Dry Kiln Control Devices
___Dust Control Equip.
___Edge Bonding Equip.
___Edgers, lumber
___Enamel
___End Matchers
Fasteners:
___corrugated
___joint
___special
___threaded, insert
___Fastener Driving Equip.
___Filing Room Equip.
___Finishes
___Flexible Shaft Equip.
___Furniture & Chair Parts
___Gauges, saw
___Generators
___Gluer, electronic
___Gluer, veneer tapeless edge
___Grinders
___Grooves
___Guards, machine
___Guide Lights
___Guides, saw

___Guns, glue
___Guns, spray
___Hardboard
___Hardware
___Heaters, glue
___Heaters, paint
___High Frequency Electronic Bonding Equip.
___Hogs
___Humidifying Equip.
___Jointers
___Jointers, veneer
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___Lacquer
___Lathes
___Lumber, hardwood
___Lumber, imported
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___Machines, barrel
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___Machines, boring
___Machines, box & crate
___Machines, box printing
___Machines, carving
___Machines, chair
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___Machines, clamping
___Machines, cleat
___Machines, coating
___Machines, cooperage
___Machines, corner block
___Machines, dado
___Machines, door & sash
___Machines, dovetailing
___Machines, dowel
___Machines, edge bonding
___Machines, edge gluing

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Name ..... Position .....

Company .....

Products manufactured .....

Street .....

City ..... Zone ..... State .....

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UE

Supplier	Type of Adhesive Recommended	Trade Name	Recommended application and special features of this adhesive
Midland Adhesives	PVA	No. 201	
National Casein Co.	urea	No. 750	Hot press, cold press or RF.
	resorcinol	R3	" "
	casein	No. 3530, No. 30	Cold press.
Perkins Glue Co.	casein glue	Aircraft Joint	
	resorcinol-phenol	RP-20 & S-10	
	urea resin	L-100 & S-120	
Reichhold Chemicals Inc.	urea form.	Plyamines	
	phenolics	Plyophens	
	resorcinols	Plyophens	
Synco Resins, Inc.	128-CLW	Synco	Brush or spray.
Wilhold Products Co.	liquid urea	Acorn No. 516-A	Hard setting.
LAMINATING—plastic sheets			
Adhesive Products	contact	KWIK	Latex base; non-inflammable; non toxic.
American Cyanamid Co.	urea form.	URAC 110 and 180	
	mod. urea form.	URAC 185	
	mod. melamine form.	MELURAC 300	Exterior work, boilproof bonds.
	melamine form.	CYMEL 401	" "
American-Marietta Co.	urea form.	AMRES	
	resorcinol form.	RESORSABOND	
	phenol form.	AMRES	
Angier Adhesives	synthetic rubber	Super-Contact	Brush or trowel; waterproof.
The Borden Co.	polyvinyl resin	Cascorez CV-765	Fast-setting, unlimited usable life; easy clean-up.
	urea form. resin	Casco Resin 5H	High water resistance.
		Casmamite 12	"
	resorcinol form. resin	Cascophen	Complete durability; gap-filling; craze resistant.
Catalin Corp.	urea form.	Catalin Resin 813	
	mod. urea form.	Catalin Resin 8666	
Franklin Glue Co.	white resin	Griptite, Evertite	High strength; long assembly time; fast set.
	liquid hide	Franklin	High strength; good penetration into plastic; 30-45 min. maximum assembly time.
Gill Chemical Products	same adhesives and recommen	dations as under ASSEMBLY	JOINTS—dowel.
Midland Adhesives	contact (rubber)	H-1526	Spray; brush, roller.
Morningstar-Paisley	liquid resin	Paisley No. 2451	Quick setting; no heat; colorless film moisture resistant.
	contact cement	Paisley No. 1428	Highly water resistant powder; particularly for table tops.
National Casein Co.	polyvinyl	No. 7500	Cold press, quick set.
	urea	FA-300	Gap-filling, hot press, cold press, RF.
	resorcinol	R-3	Hot press, cold press, RF.
	casein	No. 3530	
National Starch Products	40-0493	Kwik Klamp	
	40-0498		
Perkins Glue Co.	urea resin	L-100 & S-120	
	urea resin (Gap filling)	L-100, S-120 and GF-10	
	urea resin	DC-246 or DC-357	
Peter Cooper Corp.	liquid hide	Type B	Strong bonds; use thin spread; long closed assembly time up to 30 min.
	polyvinyl resin emulsions	Type PV-1	For gluing plastic sheets where short press time is required—15 min. or less.
	mod. polyvinyl resin emulsion	Type PV-2	For gluing under ordinary conditions
Pierce & Stevens	contact	HYBOND	Brush, roller or trowel; heat resistance; non-staining; no clamps, presses or heat for curing.
Reichhold Chemicals, Inc.	urea form.	Plyamines	
	phenolics	Plyophens	
	resorcinols	Plyophens	
Synco Resins, Inc.	131	Synco	Brush, roller or spray.
United Shoe Machinery Co.	synthetic rubber solution	BOSTIK 1088	Contact type; applied to both surfaces.
		BOSTIK 1177	
United States Plywood Corp.	urea powder	Weldwood Plastic Resin Glue	
	contact bond	Weldwood Contact Cement	
United States Rubber Co.	contact	U.S. Royal M6266	Brush coat; dry for minimum of 10 min.; good up to 4 hrs. open time.
		U.S. Royal M6250	Spray coat; dry for minimum of 5 min.; good up to 2 hrs. open time.
Wilhold Products Co.	contact type cement	Wilhold Contax	Fast drying; bonds in 20 min.
	liquid urea	Wilhold Rea-x	Craze resistant.

For unsurpassed performance and durability, a new mo[illegible] of fa[illegible] tools c[illegible] finest precision an[illegible]te electric handsaw

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Sharpens 60 teeth a minute with absolute uniformity. A very special feature is that saw is firmly locked in place by solid steel cam while being filed and set. K-5 gives you better, faster cutting band saws—also saves you the cost of a second operation.

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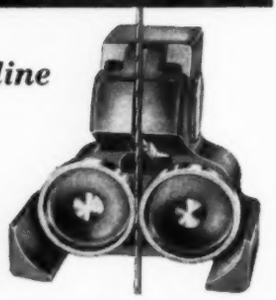
CARTER BAND SAW GUIDES

world's largest, most complete line

- For Any Saw
- Any Speed
- Any Load
- Any Purpose



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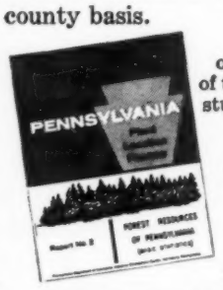
FOREST RESOURCES OF PENNSYLVANIA

(BASIC STATISTICS)

New 98-page report, just released, is of major significance to new or expanding wood utilization industries. There are approximately *15.1 million acres of commercial forest land in Pennsylvania,* consisting of more than *12 billion cubic feet of growing stock!*

Charts included in the study show breakdowns of the volume of total growing stock by species group, by diameter and size-class of the trees, by the end-use for which timber is suitable, and by species and forest-type. Tables detail annual growth and annual cut of timber in the commercial forest areas on a county-by-county basis.



You may obtain copies of this valuable study, without cost, by writing on company or business affiliated letterhead. Send requests to:

PENNSYLVANIA
DEPT. OF COMMERCE
Main Capitol Building
335 State Street
Harrisburg, Pennsylvania

How To Select An Adhesive

A number of firms supplied information for the table which appears on pages 153-161. Here are the complete names and addresses of those companies. Write directly to the adhesive supplier for more information about products for specific utilizations.

Adhesive Products Corp.
1660 Boone Ave., New York 60, N.Y.
American Cyanamid Co.
Plastics and Resins Division
30 Rockefeller Plaza, New York 20, N.Y.
American-Marietta Co.
Adhesive, Resin & Chemical Div.
3400 13th Ave., S. W., Seattle 4, Wash.
Angier Adhesives
Cambridge 42, Mass.
Armour Adhesive Div.
1355 W. 31st St.
Chicago 9, Illinois
The Borden Chemical Co.
350 Madison Ave., New York, N.Y.
Catalin Corporation of America
One Park Ave., New York 16, N.Y.
Franklin Glue Company
119 W. Chestnut St.
Columbus 15, Ohio
Gill Chemical Products, Inc.
366 Oakland St., Brooklyn 22, N.Y.
Midland Adhesives & Chemical Corp.
2600 Goodrich, Ferndale, Mich.
Morningstar-Paisley
630 W. 51 St., New York 19, N.Y.
National Casein Co.
601 W. 80th, Chicago, Ill.
National Starch Products
National Adhesives Div.
750 Third Ave., New York, N.Y.
Perkins Glue Co.
Lansdale, Pa.
Peter Cooper Corporation
Gowanda, New York
Pierce & Stevens Chemical Corp.
710 Ohio St., Buffalo, N.Y.
Reichhold Chemicals, Inc.
3715 New Pineville Rd., Charlotte, N.C.
Synco Resins, Inc.
Bethel, Connecticut
United Shoe Machinery Corp.
B.B. Chemical Co.
748 Memorial Dr., Cambridge 39, Mass.
United States Plywood Corp.
55 West 44th St., New York 36, N.Y.
United States Rubber Co.
4300 New Haven Ave., Fort Wayne, Ind.
Wilhold Products Co.
Div. of Acorn Adhesives Co., Inc.
678 Clover St., Los Angeles 31, Calif.

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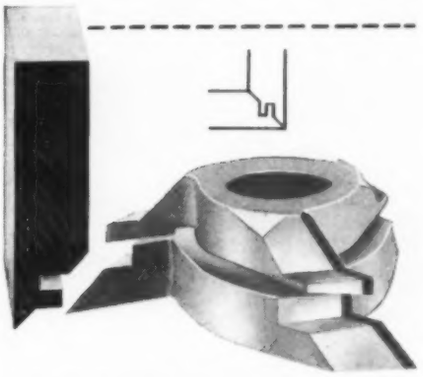
Quality CUSTOM-GROUND Shaper Tools by SCHMIDT

High speed steel or carbide tipped

Schmidt carbide tipped cabinet door cutter, used on laminated and composition board for maximum production.



Double tongue & groove lock-mitre joint made with a Schmidt carbide tipped 3-Wing cutter designed in two parts; separated to show detail.

CUSTOM-GROUND SHAPES TO YOUR PATTERN FROM STOCK BLANKS . . .

means extra fast delivery at production prices!

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Maurice Evans Dials "W" For Wood

By

Nelson Nash

The name of Maurice Evans, world famous actor, director, producer, writer is one of the most distinguished in the American theater. His epoch-marking productions of the works of Shakespeare, Bernard Shaw, "Dial 'M' for Murder," "No Time For Sergeants"—just to mention a few—are immortal masterpieces of creative genius. But we can also talk about Maurice Evans, lumberman, woodworker, designer, architect and business man. It is not generally known that Maurice Evans started in life working at Messrs. Chapel & Co. Ltd., London, England, a piano manufacturing concern. There he came to know and love the many different wood species.

A short time ago, Ed Murrow visited his house on the "Person-to-Person" TV show. Millions of viewers then discovered that there are few rugs in Maurice Evans' home. He prefers to enjoy the artistic beauty of natural wood flooring, which he calls "wall-to-wall paneling."

Actually, Maurice Evans lives in a "stable," which formerly belonged to the coachmen of Civil War generals. With shocking disregard for the beauty of wood floors, these coachmen often chopped wood on what is now Maurice Evans' living room floor. The axe marks are still there.

A PEEK BEHIND THE SCENES

"I wonder, if you in the lumber and woodworking industries realize how much wood is being used in the theater," said Maurice Evans. "We need wood not only for the stage itself, but also for battens, sounding boards, framing for scenic flats, special effects, etc., not to mention crating. And it has to be a pretty good grade of lumber too."

"But why," we asked, "after all, the audience never sees it?"

Mr. Evans replied, "That's not the point. Stage scenery is subjected to a great deal of wear and tear. Before a Broadway opening, a play is tried on the road. Not only is the scenery shoved to and fro during the actual performance, but it must be packaged and crated many times before we reach New York. Later on, if the play is a hit, we send road companies throughout the country, and sometimes all over the world. Believe me, the scenery takes a terrific beating. That's why I always make sure personally that all the wood framing is of clear sound stock with a minimum amount of defects. I am really quite amazed how well wood

STANDARD OR SPECIAL PURPOSE . . .

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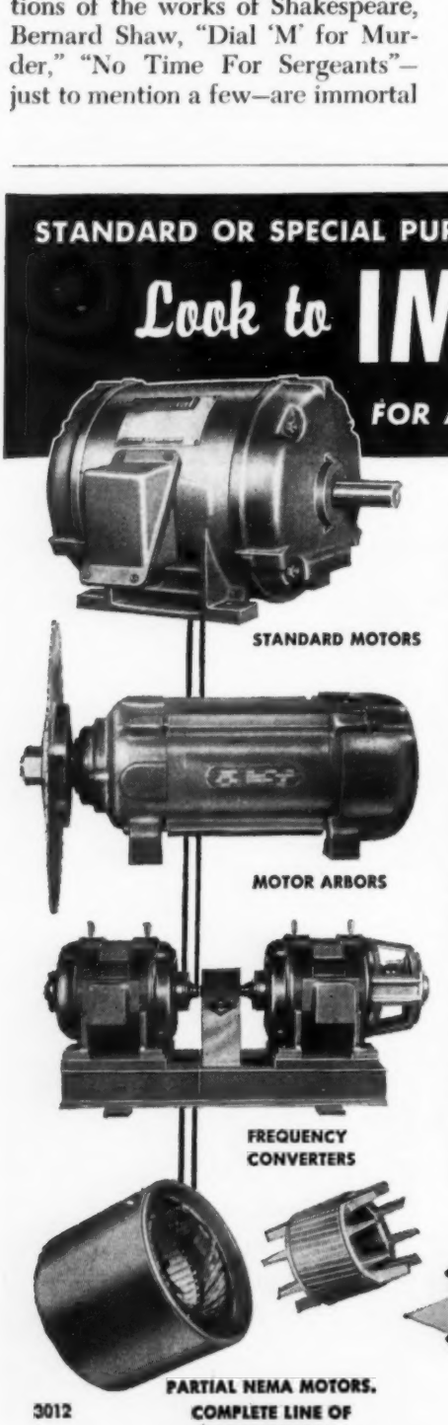
FOR ALL YOUR MOTOR NEEDS



It's an obvious fact that greatest efficiency and economy can only result from using a motor that is mechanically and electrically fitted to its application. In the Imperial line you'll find a standard or special purpose integral horsepower motor that is precisely engineered to fit virtually your every need. Illustrated are four Imperial units which find wide application in the woodworking industry. Many variations are available in mounting dimensions, rotor bores, and electrical characteristics. In fact Imperial can tailor a motor to your most exacting requirements. So whatever your motor requirements are, call on Imperial . . . and be assured that every Imperial motor you buy will be electrically and mechanically right for the job it must do.

For immediate help on a specific motor problem call your Imperial representative, or write Dept. I W-1 . . .

Since 1889

THE Imperial ELECTRIC CO.

AKRON 9, OHIO

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stands up to these rigorous demands."

WOODLIGHT MAGIC

Mr. Evans continued, "Plywood plays an important role in the legitimate theater. Perhaps you will recall that in the play *Teahouse of the August Moon*, a full-sized jeep was driven on the stage. That jeep was made of plywood. It was so cleverly designed, that it could be folded up, stored and transported in a small box."

"Have you ever tried to use other materials with which to achieve your dramatic effects?" we asked.

"Yes, of course," Maurice Evans replied, "but we always come back to wood and plywood. Pound for pound, and inch for inch it is the strongest building material and the most economical. Besides, in case of accident, it can be repaired easily anywhere in the country."

It is well known that actors and actresses set the fashion in clothes, haircuts and first names. Similarly—although people are not consciously aware of it— stage settings often signal and influence new trends in furnishings and interior decorating. Being an ardent woodworker-hobbyist, Maurice Evans understands the problems and frequently collaborates with the country's leading furniture designers.

A sensitive and sensible man, Evans takes great pains in the selection of the furniture for his productions. Whenever the mood calls for comfortable, elegant, warm decor, he usually favors wood furniture, paneling and accessories.

A PIN DROPS

The great artists of old were not satsfied merely to paint masterpieces. They insisted on preparing their own paints according to their own secret formulae, which have never been discovered nor matched by modern chemistry. Similarly, Maurice Evans is not satisfied to just star in, direct or produce his plays, he takes a firm hand in even the smallest details in his stage presentations. He is an unrelenting perfectionist. The following story will perhaps illustrate the point.

Maurice Evans is one of the

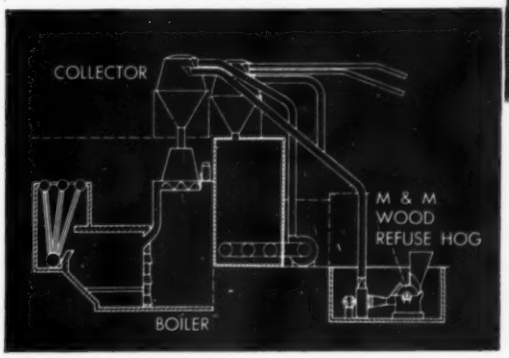
Maurice Evans, actor, director, producer and writer, is shown as Falstaff in Shakespeare's play, "King Henry IV." Mr. Evans is a loyal supporter of wood in the theatre, business and the home.

M & M REFUSE HOG INSTALLATION

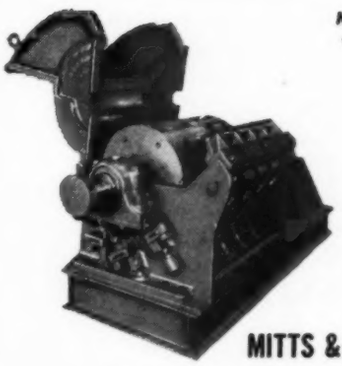
TURNS HAZARDOUS WASTE INTO VALUABLE FUEL SUPPLY

In addition to reducing fire hazards, the installation of the M & M refuse hog (shown at right) converts waste material into money-saving fuel which reduces coal bills, labor costs and creates savings in floor space.

When waste material is processed for fuel, board chips, as sawdust or wood flour, MITTS & MERRILL Hogs—which come in a large variety of sizes and models—produce a better quality, have an increased output and a more uniform product.



The diagrammatic drawing discloses the neatness and simplicity of a complete system, including storage bins and ducts, resulting in a sharp reduction in manual handling of scrap. Firms like the Ford Motor Company and Parke-Davis Company are two of the many who are using M & M refuse hogs in their plants.



M & M Hogs require less labor, and if waste wood is processed for fuel, they will keep power and maintenance costs low. The complete line of M & M hogs is available with top or side intake and side or bottom discharge. Write for complete information.

M & M HOGS

MITTS & MERRILL, 1011 So. Water St., SAGINAW, MICHIGAN

"Builders of work-saving, money-saving and material reclaiming machinery since 1854"

This full-size jeep from the Pulitzer prize play, "Teahouse of the August Moon," was made out of plywood. It was so cleverly designed that it could be folded up, stored and transported in a small box.

directors of the famous Shakespeare Festival, which is held annually in Stratford, Connecticut. When the architects submitted the first set of blueprints for the proposed building, they called for a theater built of concrete. Evans was aghast. Almost single handed, he fought for a theater to be built of wood because of acoustical considerations.

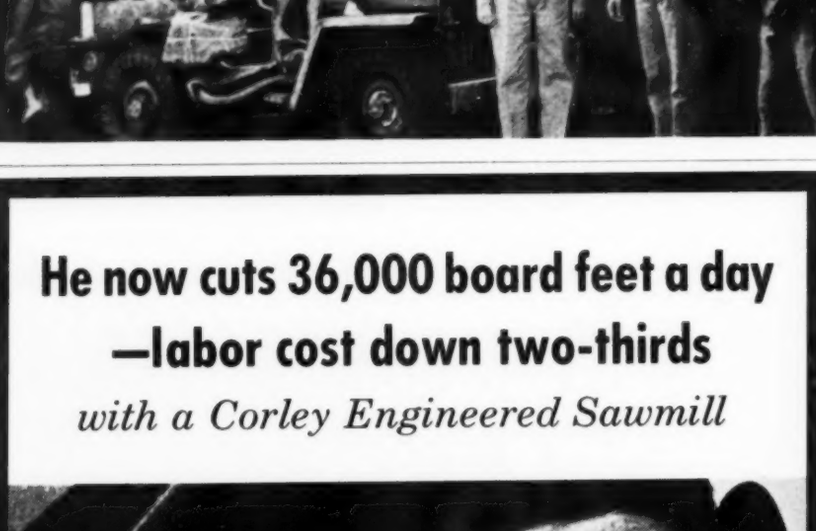
This was so compellingly important to him, that he dropped everything else and—at his own expense—traveled across the country to the Mormon Temple in Utah, to study the perfect acoustics in that famous wood structure. Even a pin can be heard to drop in this magnificent edifice. His early training in the piano factory had taught him the important part wood plays in the transmission of sound, and it gave him the practical background for understanding the problems of sounding boards and sound waves. When he returned from Utah, he brought so much overwhelming and irrefutable evidence that all the other members of the board of directors went along with his ideas. Needless to say, the acoustics in the theater in Stratford are well nigh perfect.

BUSINESS AND PLEASURE

It is estimated that more than 50% of all manufactured goods on the market today were virtually unknown 10 years ago. Simultaneously, there was another development in the business world. Not only were these inventors clever enough to create new products, they also developed new methods and ways of promotion.

He now cuts 36,000 board feet a day —labor cost down two-thirds

with a Corley Engineered Sawmill



Case History 901: Shows how this former Concentration Yard Operator cut labor cost two-thirds with a Corley Engineered Sawmill. Send today for this complete case history.

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CORLEY SAWMILL MACHINERY

Cost-cutting is Our Business

One of these avenues of approach led directly to the door of Maurice Evans, who by request entered the field of industrial presentations with the establishment of Maurice Evans Industrials, Inc., New York, N.Y. This company is now engaged in the creation, development and staging of both "live" stage shows and closed circuit TV presentations for sales meetings, dealer and distributor preview showings, conventions, and other specialized functions of business and industrial firms and associations.

"The necessary period of experimentation in the field of industrial presentation has come to an end," said Mr. Evans. "The time is ripe for true showmanship for industry—showmanship that, in keeping with the times, is both creative and inventive but which keeps its eye on 'budget.' Naturally, lumber and plywood play a big part in such a program. Basically, the problems are the same as in the theater. Industrial exhibits, just like stage props, receive unmerciful punishment, because they must be packed, folded, crated and shipped many times while being displayed on one-night, one-week, or one-month stands."

It is a fact, that we in the lumber and woodworking industry have only recently awakened to the urgent need for modern advertising methods. The National Lumber Manufacturing Association has blazed the trail by starting a $1,250,000 campaign for wood directed at the consumer.

It is our fervent prayer that some of our lumber, woodworking, and furniture associations and private companies will realize that showmanship is needed in the presentation of any sales message, which must be presented with taste, imagination and pace—but which never for a moment forgets that its primary duty is to showcase the star.

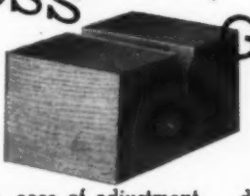
Some companies have done an outstanding job. Consumer magazines, particularly those of the shelter category, have also dramatized wood, but it is only by constant, consistent effort that we can assure wood the starring role it deserves!

Maurice Evans and Nelson Nash examining a sheet of prefinished mahogany face veneer.

BADGER

BADGER GROOVER DISCS ARE DESIGNED TO PRODUCE CLEAN CROSS GRAIN CUTS

Fig. 668



Clean cutting action, ease of adjustment, low maintenance cost, and extremely accurate cutting of the pattern were obtained by replacing dado saws with the BADGER Groover Disc shown. Two ground-to pattern knives made with BADGER Corrugated Back High Speed Steel and a special shaped head body, giving good knife support, form a safe, reliable cutterhead without wobble to make an accurate cut. There are two pairs of spurs on each side of the disc; each pair assures a sharp, clean cut at the bottom of each shoulder.

Cutting a chamfered groove **across the grain** calls for a BADGER **Engineered** Groover Disc to reduce tearouts and to hold dimensions precisely. When using dado saws, too much sharpening was required and the saws also were difficult to adjust to maintain the desired width of cut. While the initial cost of the dado saws was less, the overall long-range cost of the BADGER Groover Disc proved to be more economical: longer runs between sharpenings meant less down time; greater accuracy of the cut meant fewer rejects and better fits; the easier cutting action resulted in less horsepower consumed.

BADGER Engineers are available to help you with any and all wood cutting applications. Send your wood samples or sketches together with machine specifications **on to Wisconsin** for free engineering advice.

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SEND FOR *Free* COPE & TENON TYPE HEAD BULLETIN #500

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BELOIT, WISCONSIN

Plastic Laminate Use Parallels Growth in Population

A Report on the Development of Plastic Laminates by the Decar Plastic Corporation

The history of plastic laminates goes back more than 25 years when it was developed and used initially in industry. The use of decorative plastic laminates didn't become widespread until shortly after World War II. This use, as far as furniture for the home was concerned, was limited initially, to surface material for dinette sets. Early in the development and use of these decorative plastic laminates, the inherent advantages were realized: ability to withstand all sorts of abuse, both from the various strong liquids found in the household such as alcohol, bleach and the physical abuse given furniture by the users of that furniture. The patterns of those early laminates were limited almost exclusively to the decorative patterns, usually in bright colors. This was during the time the dinette set was used almost exclusively in the kitchen.

As dinette sets came to be redesigned for use in dining rooms, and family rooms, the plastic laminate manufacturers began to develop wood grain patterns for these restyled dinettes. This wood grain development opened up an entirely new field for use of plastic on occasional furniture. Now furniture manufacturers had not only the advantages of plastic to resist wear but the natural beauty of wood grains for beauty as well.

From the development of plastic wood grains it was a natural step to school furniture. Schoolrooms were "going modern" adding color and style to the schoolroom yet at the same time increased overhead and scarcity of help required that products for the school be as highly maintenance free as possible. Here again decorative plastic laminates were the answer to both beauty and ease of maintenance for surface materials. Patterns used were largely of the wood grain type which led to even further development of additional wood grains. This evolution of the wood grain patterns beginning with their use on occasional furniture and continuing through school furniture continued until plastic began to be used on the better type case goods.

Early Problems

Aside from minor technical problems, the production of plastic laminates has been relatively trouble free. Nearly all of the problems resulting from the use of plastic have been in the application of this plastic to various core materials. Early users soon mastered the bonding of plastic to plywood core materials. When other core materials were tried, problems arose not from the plastic itself but the bonding of the plastic to the core material which resulted in dissatisfaction with the finished product.

When these early problems began to develop, Decar Plastic Corporation expanded their research and laboratory facilities to bring the answers to furniture manfacturers that were using this firm's products. From this research formulas, practices and procedures were developed for controlling problems of application such as the proper glue for various sub-structures, the proper pressure, insuring that the materials were in equilibrium from a moisture content standpoint, before the materials were brought together in a composite assembly. This research also opened up new sub-structure applications such as chipboard core material, honeycomb cores, and solid wood core material. Not all of the problems of application of plastic laminates have yet been solved but the plastic industry as a group are continually working on these problems through such organizations as the Forest Products Research Society.

Plastic Laminates Gain in Acceptance

There are several reasons why plastic laminates such as Decarlite have gained tremendously in acceptance since the war. One of these previously mentioned is their availability in almost unlimited quantities as opposed to the natural wood veneers which are diminishing as a result of natural inroads by increased demand for these veneers. Another important reason for the increased demand for plastic laminates is the great strides made by the in-

NEW

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No. 2 SINGLE SURFACER

HERE'S A LITTLE BEAUTY!

ALTHOUGH the smallest surfacer in the line, it's still a heavy, well built, smooth running machine, with all the traditional Northfield performance and dependability. It features a greatly simplified and trouble free mechanical design.

It will take material 18" wide and from 1/8 to 8" thick, at variable speeds of from 26' to 60' per minute. Highly recommended for manual training shops, sash and door, and furniture plants.

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The NORTHFIELD Guarantee

We guarantee perfect satisfaction to anyone who may purchase our machines, and if any reasonable exceptions are taken to their good performance, they may be returned at our expense.

Northfield FOUNDRY & MACHINE CO.

★ ★ ★ NORTHFIELD, MINNESOTA, U.S.A.

dustry in providing authentic wood grain pattern reproduction that very closely duplicates the natural wood grains of the wood itself. The third important reason for the new acceptance for plastic laminates is the inherent advantages of the product itself. Modern homemakers demand and are receiving with plastic laminates the modern "Care-Free" products they want for today's modern living. The natural beauty of plastic is easy to maintain, resists the wear and tear that is found in today's homes, homes that in most cases have small children or school age children, homes that are lived in more with families using furniture more than ever before. This use demands the easy cleaning and beauty that comes with plastic surfaced furniture. Through the standards established by NEMA (National Electrical Manufacturers Association) the consumer is assured of the standards of high pressure plastic laminates from a performance standpoint. These have all contributed to the growth and acceptance of high pressure plastic laminates as a "natural" surface for all types of furniture for the school, home, office and other service establishments.

Future use of plastic is limited only by the application of the product. If the trend for further utilization is to continue, the plastic industry must develop basic data needed for the application of plastics such as equilibrium moisture content under various humidities and other data to indicate performance of components in various types of assemblies. With this data established as a guide for fabrication of plastic to core materials, the future use of engineered products in plastic will be only limited by the ingenuity of manufacturers to sell a completed product surfaced with plastic.

Particle Board Tests

In an article which appeared last month, "Extruded Particle Board Makes Good Core Material," we reported on tests made. Please note that tests made on this board at the Michigan State University school did not include soak tests. Nor did the school offer any opinions as to the relative merits of various boards.

The University of Michigan has always been cooperative in working with manufacturers of wood products, but their work has been that of an unprejudiced research organization dealing with facts. In no case would that institution wish to express judgment on, nor recommendations for a particular product.

Crating Fastener Protects Furniture

Vibration and rough handling actually tighten rather than loosen an unusual new crating fastener developed by Shakeproof Division of Illinois Tool Works.

Shakeproof crating fastener for shipping.

The new fastener is a pre-assembled crating washer and thread-cutting screw. The four sharp teeth bend down at the corners of the washer provide positive locking action. They bite into the wooden crate—bite deeper when jarred or jolted during shipment so the crated product stays securely in place.

There are important cost-saving aspects to the new fastener. The pre-assembly principle means faster application, with no handling of separate washer and screw. In addition, the thread-cutting feature performs the tapping operation in the product itself, and eliminates the use of a nut to retain the screw. It is possible to quickly insert leveling screws into the threaded holes in the product when the crate is dismantled and the product installed.

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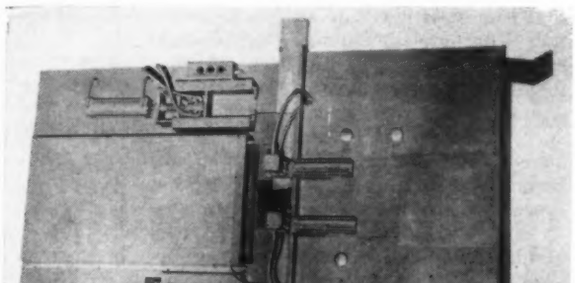
The Shakeproof crating fastener is available with hex head, flat head or other head styles. As another variation, the crating washer may be pre-assembled to a Shakeproof Type 17 screw that drills its own hole in the wood as it is driven. The elimination of pre-drilling offers further savings in some applications. In these self-drilling fasteners, crating washers are free-spinning so they will not chisel wood as the screws are tightened.

Further information and samples may be obtained by writing Shakeproof Division, Illinois Tool Works, St. Charles Road, Elgin, Illinois.

Use postpaid card. Circle No. 4

Complete Finger-Jointing In One Pass

A new high-production finger-jointer that machines both male and female finger joints with the same cutter at a single pass has been announced by the Union Tool Corporation, Warsaw, Indiana. The "Union Automatcher" machines male and female sections simultaneously, eliminating the need to turn material over to machine a finger-joint in the opposite end or to have two machines with matched sets of cutters.



Union Automatcher cuts both male and female joints at a single pass.

In operation, material to be finger-jointed is positioned at the proper location. Next the operator pushes two palm buttons on the bottom of the control panel to assure hands are free from work area. These controls start the air-operated stock clamps which, after clamping the cutter head and saw assembly, cycles automatically to finger-joint the material and release it to permit repositioning of stock for the next cycle.

The Union Automatcher is of welded steel construction and features ball bearings on slides and anti-friction, self-aligning bearings on other assemblies. A 5 h.p., 3600 r.p.m. motor powers the squaring saws; a 7½ h.p., 3600 r.p.m. motor powers the finger-joint spindle.

The carriage drive for the Union Automatcher operates on an air-hydraulic system, and the material clamps are of the air cylinder type. Maximum thickness of material handled by the new finger-jointer is 2", and minimum thickness is approximately ⅜"; maximum width 8", and minimum width is approximately ½".

An additional feature of the Union Automatcher is that it can be used as a defect saw. Small defects up to 3" in width can be cut out with a single pass through the cutters.

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Band Saw, Fay & Egan No. 950-36", DMD
Cut-Off Saw; Fay & Egan, No. 398 dbl. Cab.
Dovetailer, Dodds, 15 Spindle, MD
Jointer, Oliver, No. 116-16", DMD
Jointer, Glue, Yates No. 213, DMD
Router, Y-A No. U-90, 3 HP, Hi-Speed, DMD
Moulder, Woods No. 132 M10" all electric
Moulder, elec. Y-A C-89-10" with frequency changer, 5400 RPM spindle speed
Nailing Machine, Morgan No. 24-75" spread of nails, open back 66" between housings, MD.
Planer Parks, 12" & 4" thickness, 1 HP, single phase
Radial Saw Multiplex No. 60—5 HP.
Radial Saws, New Delta 1-2-3 and 5 HP.
Rip Saw Roll Fd H & B No. 223—10 HP DMD
Sander, 49" Endless Bed Y-A 3-drum No. 433 motors on drums, ball-bearing
Shaper, New Crescent No. S-2, single spindle, 2 HP motor, 9000 RPM spdl. spd.
Sticker, 3-side, Jenkins model 65, Sash & Door Sticker, P.&B. attach., 10 HP motor
Tilt Arbor Saw 10" Walker-Turner & Atlas
Planer, Single Whitney No. 32 30" x 7" babbitt bearing, 10 HP motor, MD.
Planer, New Powermatic, 16" x 6" single
Planer, Double Yates Model B, 30" x 7" babbitt bearings, MD.
Rip Saw, No. 112 Depend Roll Fd, 20 HP
Tenoner, single end Greenlee No. 532, all electric 2 HP motors on each arbor
All motors 3 ph. 60 cycle, 220 volts

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DeVilbiss, 15 HP & 10 HP
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New Britain No. 2 and 7
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Wallace Chisel Mortiser, Motor Driven

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S. A. Woods 134M, 12" DMD., B.B.
Yates American C 55 8 x 4 All Electric B.B.
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Triumph 4 side, 24" Planer & Matcher, B.B.
Whitney No. 29, 40" CMD, BB

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Ekstrom Carlson No. 156
Onsrud 240
Onsrud No. W 244E 5 HP 2 speed
Porter No. 666

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Beach Hand Block MD, 2 HP
Oakley Edge H-5, Osc. New
Oakley Edge H-6 Osc. New
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Covel-Hanchett—Band Re-Saw Grinder

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Yates-Amer. 213 cont. chain feed, d.m.d., b.b.

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New Britain No 2 chain, motor driven
Northfield Vert. Chain, Power feed. Mtr. Dr.
Wysong & Miles No. 321 Vert. Hollow Chisel, D.M.D.
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American 24-in. disc and oscillating spindle
McKnight Vertical oscil. sgl. drum, motor drive
Superior No. 145 Db. end Cone, d.m.d., B.B.

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Monarch "Unipoint", Radial Arm 5 H.P., D.M.D., B.B.
Tannewitz "M" Mitre and cut-off chop saw, dmd, b.b.
Jenkins No. 105 Chain Feed Dbl., with Copes, D.M.D., B.B.
Delta "MH" Radial Arm 1½ H.P., D.M.D., B.B.
Bell No. 12-B Double Mitre & Cut-off, DMD. M.D.
Porter C-43 Floor Type Straight Line, Ballbearing, direct motor driven

SAWS—VARIETY
American No. 30 rip and trim, tilt-table, motor-drive
Whitney No. 77 Tilt. Arbor, BB, DMD

SAWS—RIP
Beach No. 183 Spur feed, DMD, ballbearing
Yates G-2 Chain Feed, Ballbearing, D.M.D.

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Porter double spdl., hi-speed, b. brg., dir. mtr. dr.

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Industrial Electric 1/2 HP 1750 RPM Double End Knife Grinder
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Vonnegut latest model 8" electric moulder, hopper feed.

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Buss 30" Direct Motor Driven Ball Bearing Single Planer
Whitney 40" No. 29 direct motor driven ball bearing Single Planer

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1—Whitney 36" No. 24 Direct Motor Driven Ball Bearing Double Surfacer

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Curtis Semi-Automatic Stroke Sander
Mattison No. 124 Auto. Stroke Sander
Solem 49" Type SE7-3 Direct Motor Driven 3-Drum Sander
Yates-American 49" No. S33 direct motor driven ball bearing endless bed sander
Yates-American 49", No. 433, Motor Driven, Ball Bearing, Endless Bed Sander

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American 48" No. 109 ball bearing vertical left-hand band resaw
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Mershon 54" Band Resaw
Yates Direct motor driven 36" Band Saw

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Red Star Cut-Off Saw similar to DeWalt
DeWalt Model GK 5 HP Cut-Off Saw
Eaglesfield Direct Motor Driven Ball Bearing Swing Saw
Wilkin-Challoner No. 620 Electric Panel Sizer with Copes
Greenlee, No. 542 Electric Panel Sizer, with copes

SHAPERS

Moak No. 7 high speed, Single Spindle Shaper
Onsrud No. 125 Automatic Shaper

TENONERS

American No. 1 Single End Tenoner
Greenlee, No. 542 Electric Panel Sizer, with copes
2—Jenkins No. 95 Electric Dbl. End Tenoners
Wilkin-Challoner No. 70 Electric Ball Bearing Double End Tenoner
Wilkin-Challoner No. 620 Electric Panel Sizer with Copes

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197—Turnbuckle, retaining clamps, 36" long
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Dennis Model 3 Taping Machine
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Diehl No. 77 Waterfall Grooving Machine
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In 1919 BUSS pioneered the use of *High Speed Ball Bearings in planers;* 1922, *Direct Motor on the Arbor Cutterhead Construction;* 1923, *Drop-Forged Sectional Chipbreaker and Roll;* 1925, *Multi-Speed Motor and High Frequency;* 1930, *Chrome Plated Wearing Surfaces;* 1935, *Built-in Reduction Unit,* eliminating fast-running gears; 1941, *Pressure Bar Micrometer Control* (patented); 1946, *Instantaneous Lower Roll Micrometer Adjustment;* 1948, *Shearing Bar* (patented); 1950, *Chipbreaker Micrometer Control* for adjustment of chipbreaker (patented); 1956, *Commercial production of 59" wide Double Surfacer;* 1950-58 *Special Production Surfacers.*

All the above are exceedingly valuable developments as proven in actual production and were *found first in BUSS planers.* Consequently, to be sure the planer you buy today is modern to the minute with all the features necessary to produce the most and the best planing at lowest cost, be sure it is a BUSS Planer. Write for bulletins or consult us and judge for yourself.

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6 MODELS
40 SIZES

No. 4-L Single Surface, medium sized planer for first cutting and finishing work.

No. 44 Single Surface, 4 roll planer for first cutting and finishing work. **No. 66** — 6 roll.

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MICRO-SURFACER for planing hardwood and other very thin materials.

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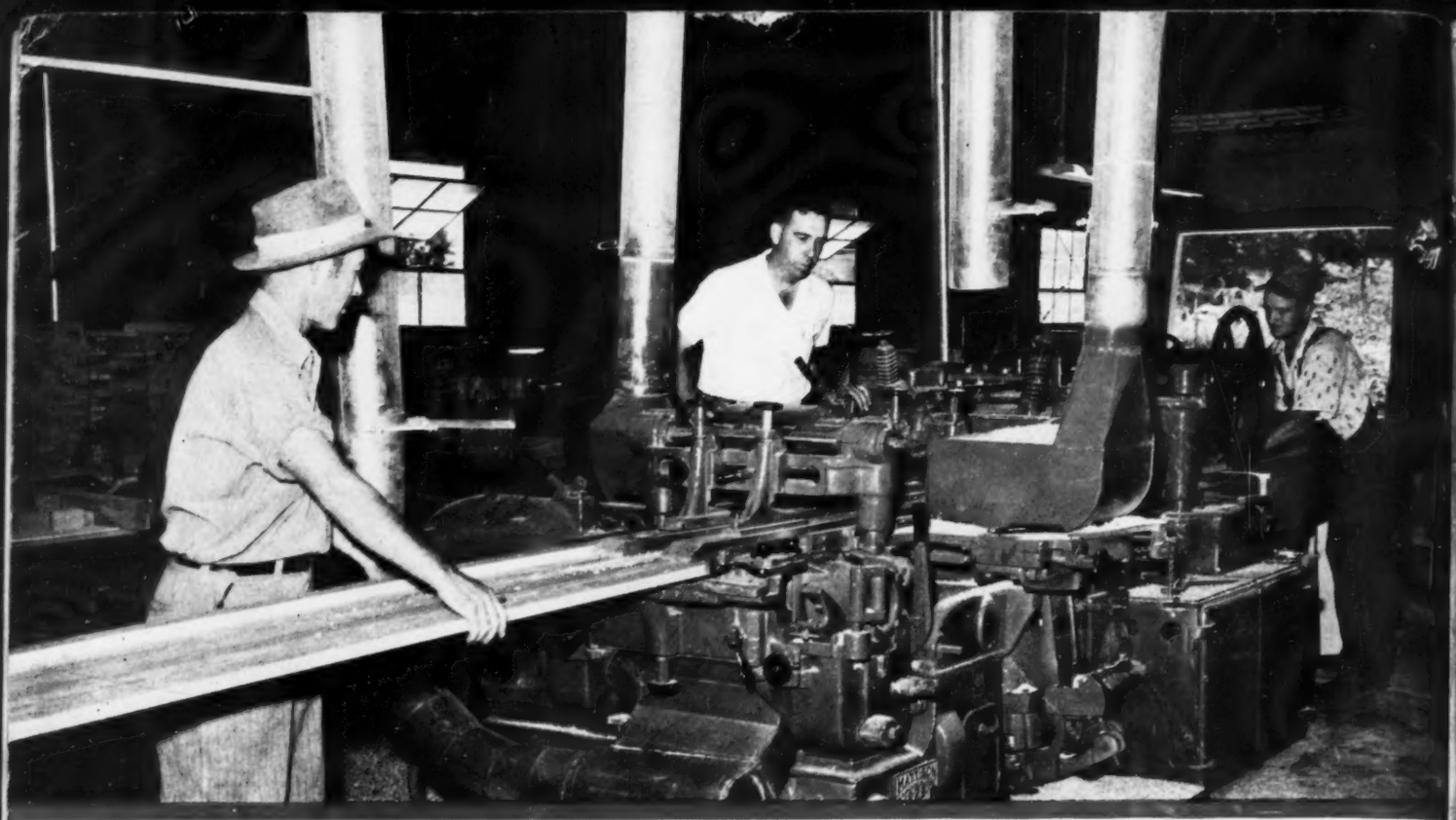


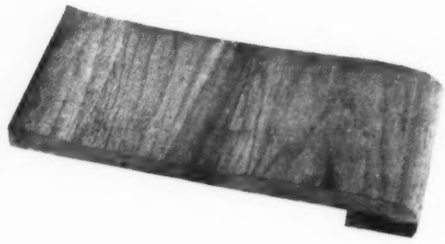
Ability to handle the UNEXPECTED... acid test of woodworking machinery

...an unusual moulding job at Turney Wood Products, Inc., Harrison, Ark.

This job illustrates a principle which should interest woodworking executives who are good judges of machinery.

Most machines are built to do the *usual job* well. But, when you buy a Mattison Moulder, you get a machine that not only will do the "usual" job faster to higher quality standards, but also will deliver *something extra* for the unexpected job that "pushes" its true rated capacity.

This "No. 228" was purchased by Turney Wood Products, Inc., Harrison, Arkansas, as part of a $120,000 capital expansion program aimed at greater utilization of materials and increased volume. Maximum capacity is 16", and yet the moulder is being used exclusively for shaping deep-formed pew bottoms which are 15⅝" wide, with a 1⅞" double leading edge and beveled back edge. Claude Turney, president of the company, says: "This job requires an extremely heavy cut for the bottom head which shapes the pew seat, and for the inside head as well. The Mattison No. 228 Moulder does an excellent job and *saves us many dollars in sanding operations* over the way we were doing it before."



This section of a 15⅝" wide pew seat taken from a regular stock run on the Mattison No. 228 Moulder at Turney Wood Products, Inc., reveals the smooth surface finish after being shaped by the bottom head.

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276-6" ☐ 229-8" & 10" ☐ 226-12" ☐ 228-16" ☐

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Company_____

Address_____

City_____ Zone____ State_____